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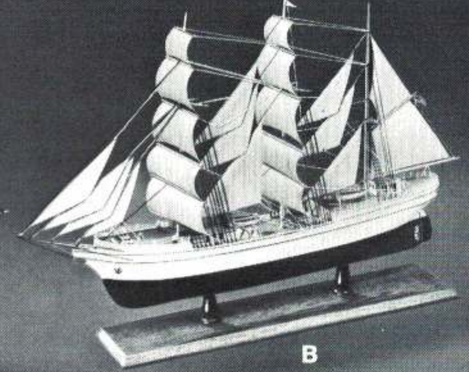

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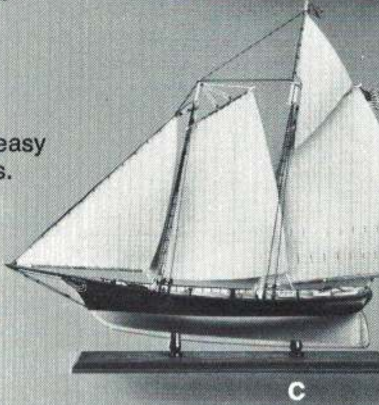

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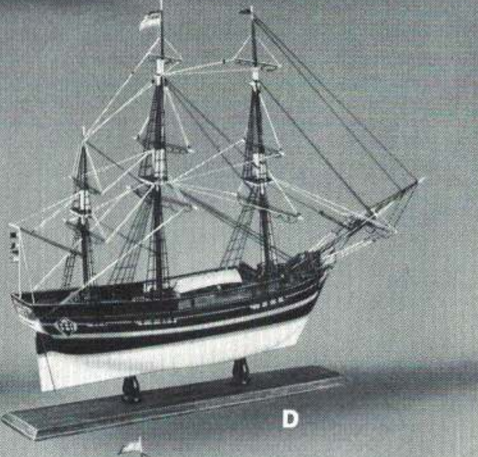

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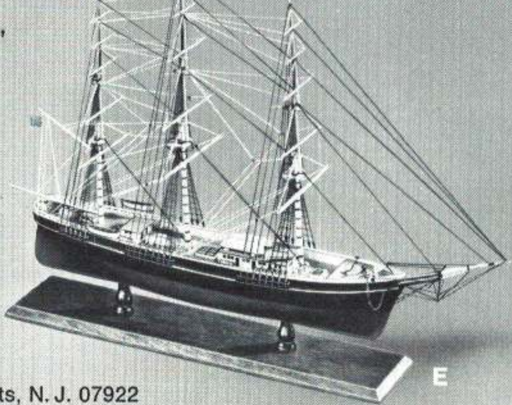

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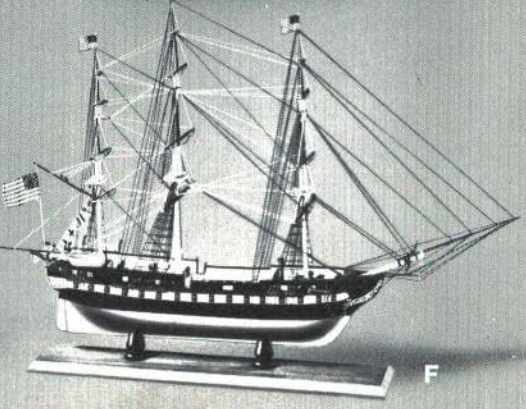

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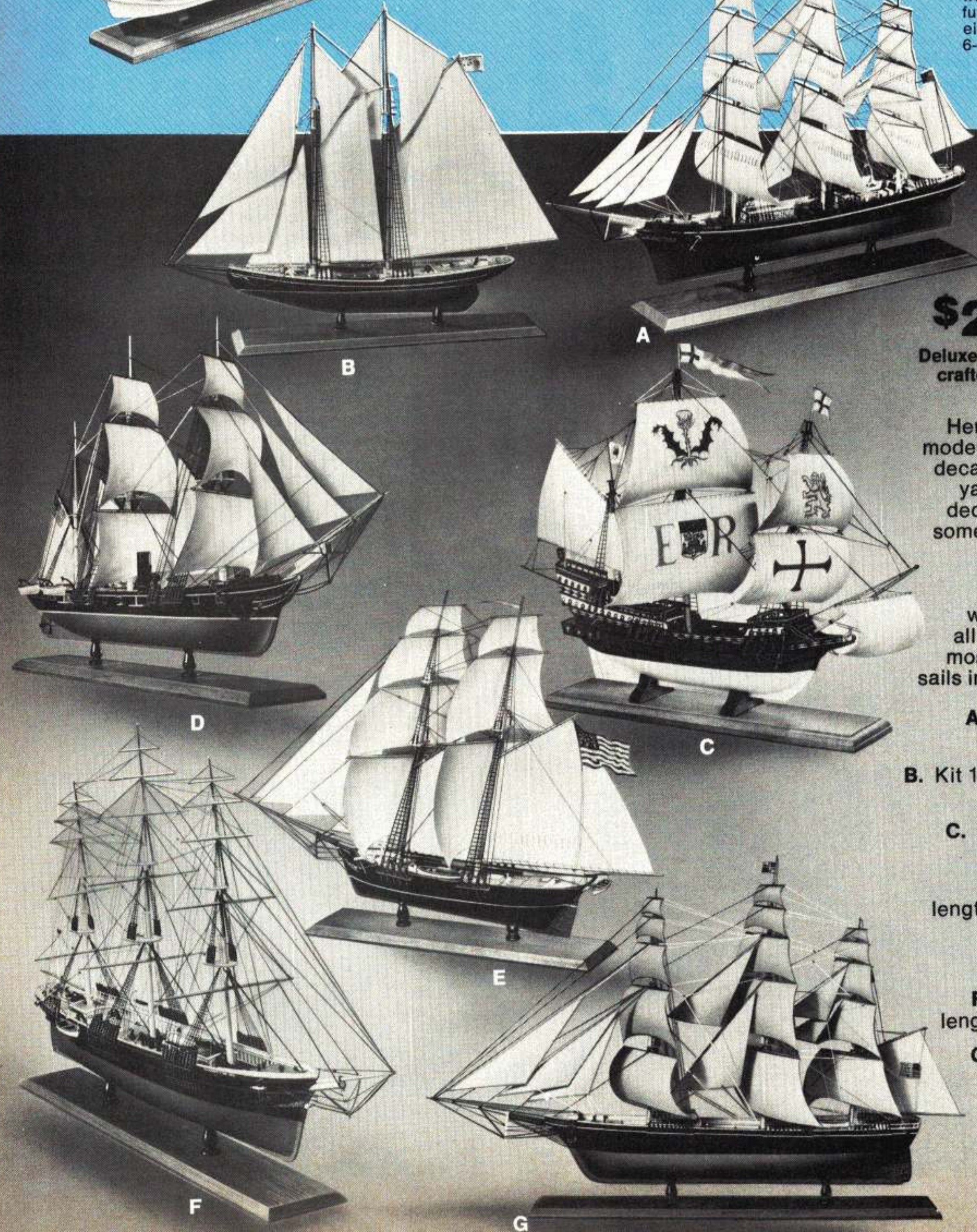

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● AMERICAN
# aircraft modeler

VOLUME 78, NUMBER 2 FEBRUARY 1974

COVER STORY

Thomas Koster of Denmark takes a breather between rounds at the 1973 Free Flight World Championships at Wiener Neustadt, Austria. The Grootna model is one of the new flapped-wing breed of FAI power ships. Story of Internats on page 24. Cover Photo by Ron Coleman.

MODEL WORLD

12 UPLIFT: WYOMING MIDDLE SCHOOL *by James Miller*

14 ON THE SCENE: UNITED PYLON RACING CIRCUIT CHAMPIONSHIPS *by E. Kent Landefeld*

STUNT

16 Don Lowe on RC/Lew McFarland on CL

17 WORLD RC PATTERN CHAMPIONSHIPS *by Jerry Nelson*

DURATION

20 Bob Meuser on FF Sport/Carl Maroney on RC

24 WIENER NEUSTADT WORLD FF CHAMPIONSHIPS *by Ron Coleman*

28 NEBULA *by Dick Sarpolus and Arni Pedersen*

RACING

36 John Smith on CL

SCALE

42 Bill Boss on CL/Walt Mooney on FF/Claude McCullough on RC

43 PAZMANY PL-1 *by Nick Ziroli*

52 200 MPH VOLKSWAGEN? *by Don Berliner and Bob Pauley*

PRODUCTS

62 NEW PRODUCTS CHECKLIST *by Eric Meyers*

64 AAM TESTS *by Duane Lundahl, Bob Brown, Maynard Jubert, Fred Marks, Don Botteron, Bruce and Carol Zabransky*

MODEL TECHNIQUES

69 AAM 3-4 CHANNEL TRANSMITTER CONVERSION *by Fred Marks*

SPECIAL INTEREST

72 John Blum on CL Carrier/John Burkam on Helicopters

GETTING STARTED IN RC

38 SUPPORT EQUIPMENT FOR RC FLYING *by Jim McNerney*

FOR THE TENDERFOOT

56 TROJAN TENDERFOOT *by Fred Beseler*

ACADEMY OF MODEL AERONAUTICS

102 1974-75 RC AND GENERAL RULES

104 AMA ACTION RE 27 MHZ CRYSTAL SALES

105 NEWS BITS

107 INSURANCE PROBLEMS

108 LIFE MEMBER PROFILE: JAMES ARTZ

109 CONTEST CALENDAR

DEPARTMENTS

6 EDITORIAL *by Ed Sweeney*

8 MODELER MAIL

84 AAM PLANS SERVICE

112 CLASSIFIED ADS/QUALITY HOBBY SHOPS

113 INDEX TO ADVERTISERS

114 OFF THE SCENE

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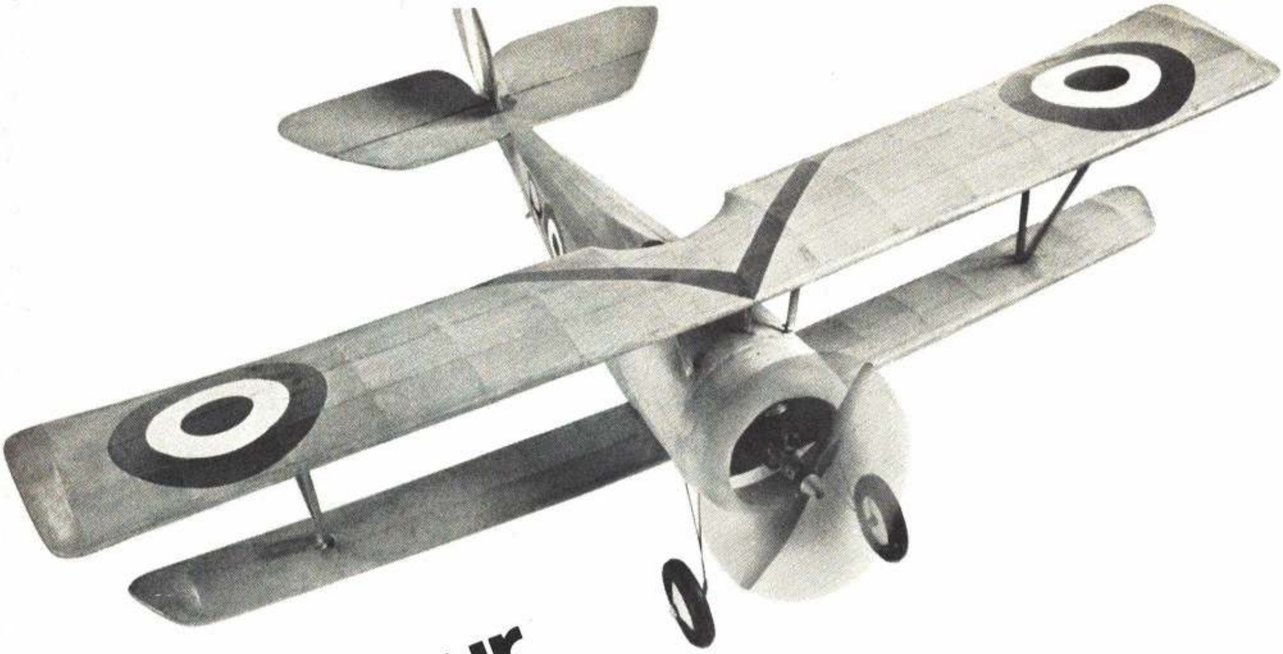

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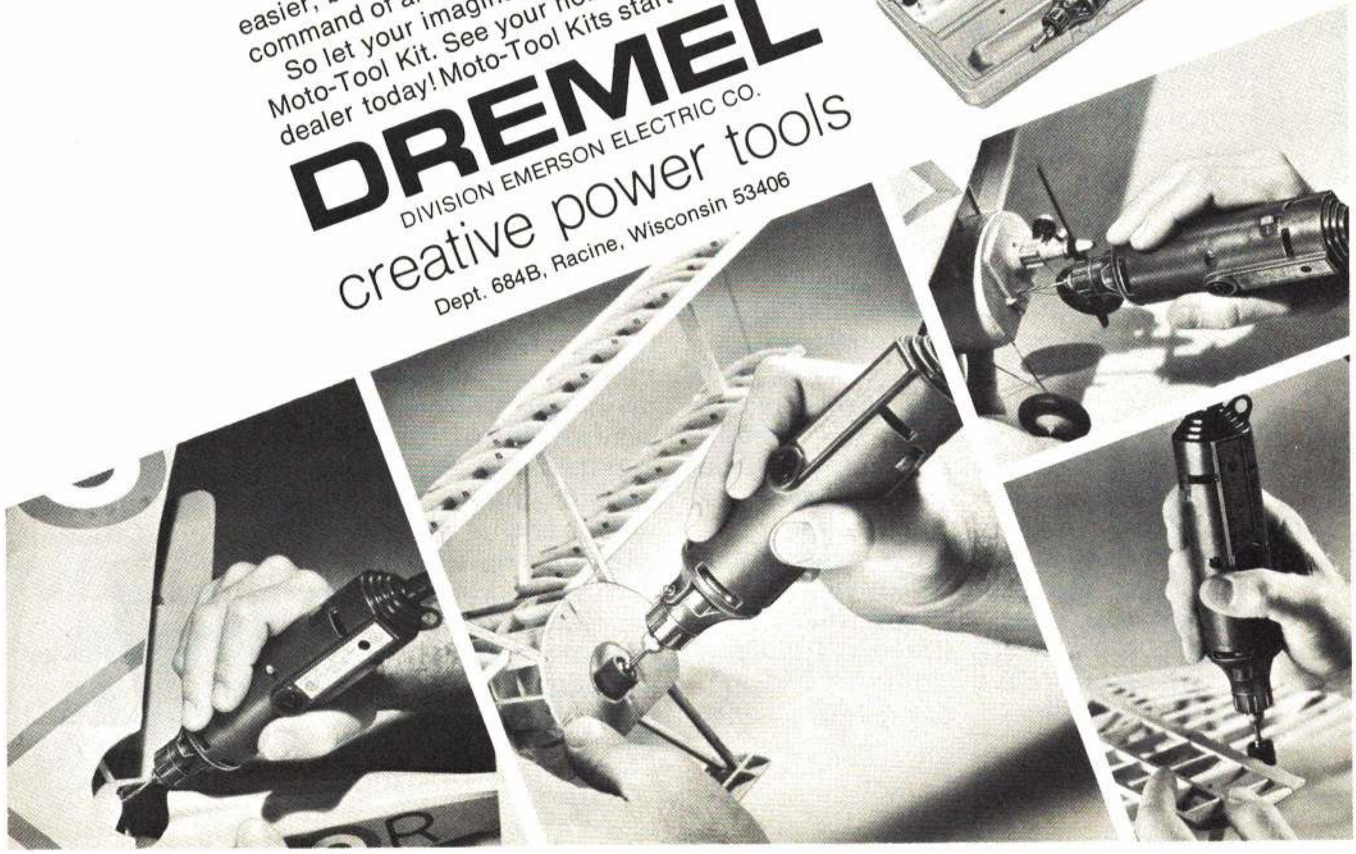


EDITORIAL

ED SWEENEY

NEW AT POTOMAC

As you probably gathered from Frank Pierce's article in the December **AAM** introducing "Those People At Potomac," we are a fairly young group who really enjoy putting together our publication. Bill Winter, our Editor for **Junior American Modeler** and the now-being-developed **Sport Modeler**, is also a young-at-heart thinker. The **Sport Modeler** will be fun. We are all involved in it here at Potomac.

For the past three issues, we have been advertising for an Assistant Editor for **AAM**. I want to personally thank all the applicants who wrote to me about the job. I was overwhelmed by the number of qualified applicants. A selection was made and we are most happy with it.

AAM's new Assistant Editor is Pat Potega. He's 29, married and a graduate of Boston University in English with training in Journalism. His wife is also currently a student; both are close to receiving their Master's degrees in English. Pat has been the manager of one of the Hobby Horse model shops in Madison, Wisconsin. He is an active modeler in all areas. In Free Flight, he specialized in Power events including Gas and Rubber. In Control Line, Pat was only involved in Stunt—and he was a contest goer, too. Most recently (in the past five years), Pat has been trying many of the RC events. He still flies CL though. He is currently most enthusiastic about contest flying in all Glider events and in Pattern. Tiger Tails go stunting with Pat; his Cumulus glider is always ready, too.

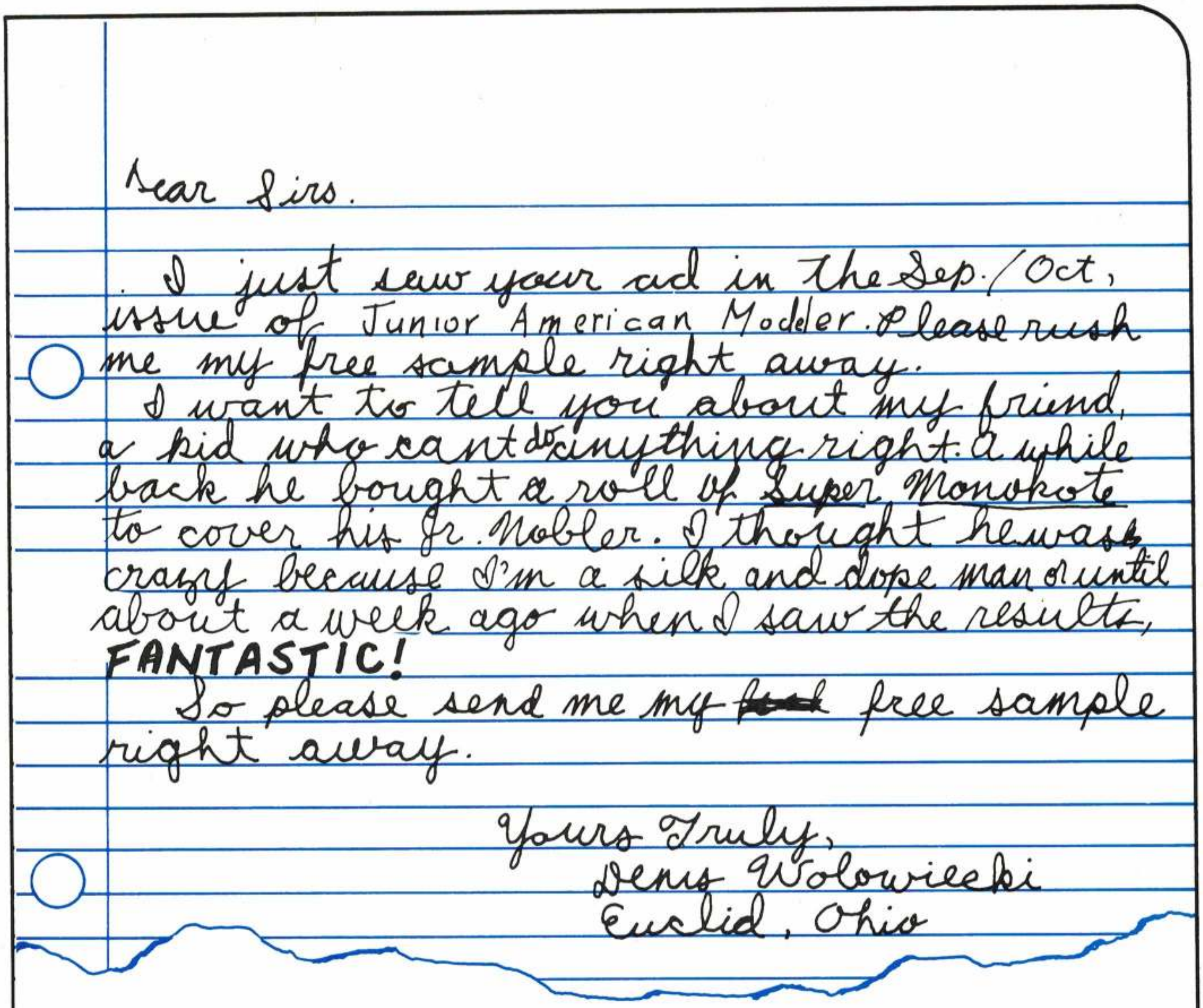
MODELING CRISIS?

Which way will modeling go in light of the current energy crisis and environmental sensitivity? Who is most affected by these considerations? The free flighter, the control liner, or the radio flier? Is it just a matter of who has to drive the furthest to get to his field? Is it just a matter of big engines making too much noise? I doubt that the above are the only considerations. Throughout this winter, the spring and summer, we will need to change many of our modeling habits. It would be best if we could prepare ourselves for these changes with some planning. In response to this editorial, will you PLEASE help with this planning?

The AMA and **AAM** are working hard on the matter of permanent and suitable flying sites for FF, CL and RC. Both of us would like to collect as much of YOUR experiences, whether successful or not, in obtaining permanent sites. Are your sites smaller then desirable because of environmental limitations? Are you severely restricted because of noise? Do you find hobby supplies increasingly difficult to obtain—at any price? Are dwindling petroleum supplies affecting availability of plastic products? How about the availability of model fuels? Perhaps the metals shortage is slowing model engine production. Please tell us where it's hurting.

Last year, we reported an RC industry wide shortage of integrated circuits, capacitors and other components. When we passed on what we learned, many modelers were more understanding of

(Continued on page 95)



Dear Sirs.

I just saw your ad in the Sep./Oct. issue of Junior American Modeler. Please rush me my free sample right away.

I want to tell you about my friend, a kid who cant do anything right. A while back he bought a roll of Super Monokote to cover his Jr. Nobler. I thought he was crazy because I'm a silk and dope man or until about a week ago when I saw the results,

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Modeler Mail

Correction

Two printing errors occurred in "Protect Your Hearing," Raymond Leone's article in the December issue of **AAM**.

On page 64 it is printed, "The standard reference pressure is the least amount of sound pressure that the human ear can just detect at 1000 Hertz, or .002 dyne per square centimeter." It should read .0002 dyne.

On page 83 in the last column it is printed, "Most authorities agree that whenever noise exceeds 90 dBA there is a risk for some individuals." It should read 80 dBA.

In Praise of Al Rabe, et. al.

The letter from David E. Mark, Sr. in the December issue upset me quite a bit. I'll bet the letter generated plenty of controversy. In regard to Al Rabe and others who have become professionals in the hobby, I offer the following comments.

Fist, aside from the money and shop equipment Mr. Mark mentions, this hobby takes TIME! Lots and lots of time. Time not spent watching TV or bowling or a lot of other things.

Second, the hobby take PATIENCE! A great deal. A plastic pilot's head for a half-A doesn't cost much, but painting one decently sure can try the old nerves.

If a person has the time and the patience, he or she still needs the devotion necessary to throw aside a lot of other pursuits and give modeling most of his or her attention in order to become really good at it. There is a lot of trial and error and a lot of heartbreak along the way to success in this hobby as well as the rest of life. Al Rabe and others like him deserve to win; they tried LONG and HARD.

The progress in design alone achieved by these "pros" always gets passed on to the junior and the junior benefits by getting better products from the industry. If a given junior keeps at it, he or she will someday become a pro. All this is taken into account by the age groups established by the AMA and almost all other organizations concerned with any form of competition.

Motor prices, amazingly, haven't changed much in the past 15 years. A younger member can more easily afford that motor today than 15 years ago, too. Balsa and fuel are higher priced, but that good motor that is so vital to keeping an interest alive is not. I really believe a child has a better chance to fly longer and cheaper today with less disappointment than when I started.

I hope the pro will always be there to develop new and better items for the junior, and to give the junior something to shoot for in the way of perfection. The pro deserves every bit of hardware he or she can win along the way, too.

I say all this looking back 20 years and remembering how I broke about 20 props getting number one off the ground. (No nylon then.) It was worth it. I eventually learned to build a lighter ship. (The "pro" at the hobby shop told me NOT to put on 20 coats of paint!)

A little nostalgia. Remember the DEE-ZIL? (A plugless GHQ.) A buddy, Chuck Asplund, and I got one running. The ether from the drug store evaporated awfully fast though, and most of the time spent trying to get this beast to run was wasted due to pure castor in the tank.

How about the Kenhi Cougar? A 40 ship when there were no 40s. And how about the Omega flying wing? The first ship I ever owned capable of a full pattern! Fast! It had to be one of the best combat ships ever built, and I believe it would still be very competitive. Strong and durable also.

I remember Gerry Wagner's combat ships, designed to use every square inch in a sheet of balsa (zero waste) with wildly flowered girls' silk scarves clear doped on the wings. I also remember Gerry's "sabre dance" with his "can-can" ship. (A couple of long coffee cans, both ends cut out, on the sides of a short fuselage with a big stab and elevator.)

I've had a lot of good times in modeling, even though I never won a rubber band. I have no less than four completed ships hanging in the cellar, only one's been flown, and that was three years ago. One house, one wife, two cars, three children plus. Plus an extra job to keep the wolves away. The result is too little time. Things are looking up though. My youngest is now in school all day, so my wife can work outside the home some. My two oldest are getting big enough to pitch in with the house and yard work. Maybe in a year or two, I'll have time to get back to it. I am trying to interest the children, and also my little brother. I just hate to see anybody sour on the hobby for any reason. I've sure enjoyed it.

Richard W. Mackiewicz
Manchester, Conn.

Thank you for your provocative letter, Richard. We agree that this hobby takes more time, hard work and patience than money and fancy shop equipment. We hope that other modelers will be inspired by your comments to persevere.

—Editor

American Hawk Is Still A Mystery

The other day, my dad brought home an October issue of **American Aircraft Modeler**. I read the article on the American Hawk, Mystery Model. I couldn't believe that it would fly, so I went out to the hobby shop and bought the necessary materials to build it. I made it Friday night and flew it Saturday afternoon. Being my first free flight model I thought it wouldn't do much. Well, I was wrong. I filled the tank up and the next thing I knew it was up a couple of hundred feet and we were chasing it. I lost it for a little while, but luckily found it in a tree. Watching the Hawk fly is fascinating. Please come up with a few more like the Hawk. It's still the prettiest ugly thing and a mystery to me how it flew so well.

Matthew Dewey
San Antonio, Tex.

Some Practical Advice

Although I am not an expert pilot, I am compelled to comment regarding some of the misconceptions which appeared in the Modeler Mail section of your June 1973 issue. Such misunderstanding could cause loss of life.

I am an engineer and sailor of many years experience. Going to windward in a yacht in a 15-knot breeze is a rail down, wet thrash. When you reach the windward mark, jibe around and set the spinnaker; the wind suddenly stops and it's time for a beer and lunch. This is because the relative wind speed was added to the boat speed on the upwind beat and subtracted on the downhill run.

Similarly, if you take off in an airplane that has a minimum flying speed of 50 mph against a head wind of 15 mph and your airspeed reaches 65 mph, your absolute velocity is 50 mph. Safe to make a 180° turn? Better have lots of altitude because your absolute velocity is the same or a little less after the turn. If you make the 180° turn, your airspeed will be 50 minus 15 or 35 mph until you can accelerate another 15 mph to regain flying speed. This can only be accomplished by diving (which will occur in any event). Therefore adequate altitude is essential.

To look at it another way, suppose you took off downwind. In order to reach the same airspeed of 65 mph which was reached when taking off upwind, it will be necessary to reach an absolute velocity of 80 mph. It should be easy to see that a longer runway and more time will be required to accelerate a vehicle weighing X pounds from zero to 80 than from zero to 50 absolute velocity.

In any event, it should be prudent to observe the wind speed and direction before takeoff. Before you can safely fly downwind you need an airspeed equal to two times the windspeed plus the minimum flying speed.

Wendell H. Calkins
Naval Architect and Marine Engineer
Saipan, Mariana Is.

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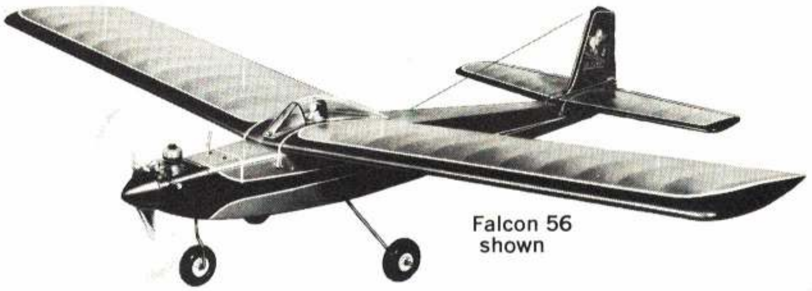

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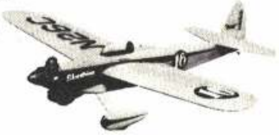

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Dumas EVOLUTION/2, 66" and McCoy .049 Engine
Total list value $21.93 PRICE $16.00

Dumas HI-LO EVOLUTION, 75" and Fox .19 R/C Engine
Total list value $49.90 PRICE $35.00

Ace ALL STAR BIPE, 34" foam wing and Fox .15 R/C Engine
Total list value $40.90 PRICE $29.00

Ace WARBIRDS, 42" foam wing (builds either P-51 or ME109 or Spitfire) **and McCoy .049 Engine**
Total list value $24.93 PRICE $18.00

Ace UPSTART, 34" foam wing and McCoy .049 Engine
Total list value $20.93 PRICE $15.00

Ace 2T Kit, 50" foam wing and McCoy .049 Engine
Total list value $20.73 PRICE $15.00

Goldberg FALCON 56, 56" and Fox .19 R/C Engine
Total list value $46.90 PRICE $34.00

Lanier PINTO, 48" and Fox .25 R/C Engine
Total list value $68.90 PRICE $49.00

Lanier SPRINT 25, 50" and Fox .25 R/C Engine
Total list value $66.90 PRICE $47.00

Midwest TRI-SQUIRE, 51" and McCoy .19 R/C Engine
Total list value $42.90 PRICE $30.00

Midwest CESSNA CARDINAL, ARF foam and Fox .15 R/C Engine
Total list value $42.90 PRICE $31.00

Midwest SUPER CHIPMUNK, ARF foam and McCoy .19 R/C Engine
Total list value $47.90 PRICE $34.00

R/C SCALE (kits only, no engines)

Sig RYAN STA SPECIAL, 72"
List price $54.95 PRICE $46.99

Sig ZLIN, 70"
List price $41.95 PRICE $35.99

Sig YAK, 72"
List price $51.95 PRICE $43.99

Sig PIPER CUB J-3, 72"
List price $24.95 PRICE $20.99

Sig CITABRIA, 69"
List price $32.95 PRICE $27.99

Sterling STEARMAN PT-17, 64"
List price $64.95 PRICE $54.99

Sterling FOKKER D-7, 58"
List price $62.95 PRICE $53.99

V-K NIEUPORT, 54"
List price $47.95 PRICE $31.99

V-K CORBEN SUPER-ACE, 56"
List price $34.95 PRICE $23.99

Sterling PIPER CUB J-3, 54"
List price $17.95 PRICE $14.99

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R. P. did...

"Your service is fantastic. It is easier to order from you than drive to my hobby shop 15 miles away."
R. P.,
Chalfont, Pa.

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Ace ACE HIGH, 70" foam wing and McCoy .049 Engine
Total list value $22.93 PRICE $17.00

Airtronics OLYMPIC 99, 99"
List price $44.95 PRICE $36.00

Airtronics QUESTOR, 62"
List price $29.95 PRICE $24.00

Lanier HAWK 750 ARF, 75" and Hobby Lobby Medium Hi-Start rubber
Total list value $38.90 PRICE $29.00

Midwest LITTLE "T", 74"
List price $18.95 PRICE $12.00

Marks WINDFREE, 99" and Hobby Lobby Medium Hi-start rubber
Total list value $43.90 PRICE $33.00

Marks WINDWARD, 72" and Hobby Lobby Medium Hi-start rubber
Total list value $34.90 PRICE $26.00

Sterling SCHWEIZER 1-34, 98" and Hobby Lobby Medium Hi-start rubber
Total list value $41.90 PRICE $32.00

Southwestern Sailplane's HONKER and McCoy .049 R/C Engine
Total list value $22.93 PRICE $16.00

World Engines 1/2 DIAMOND, 50" and Fox .29 R/C Engine
Total list value $47.90 PRICE $34.00

Southwestern Sailplane's BABY BOWLUS and McCoy .049 Engine
Total list value $30.93 PRICE $22.00

Southwestern Sailplane's TOP CAT and McCoy .049 Engine
Total list value $30.93 PRICE $22.00

HOT R/C MULTI'S

Midwest MACH I, 62" and Fox Eagle .60 R/C Engine
Total list value $119.90 PRICE $79.00

World Engines HAWK 460, 52" and Fox .36 R/C Engine
Total list value $57.90 PRICE $40.00

Sterling RIMFIRE, 56" and McCoy .40 R/C Engine
Total list value $55.90 PRICE $40.00

Top Flite KWIK FLI III, 60" and Fox Eagle .60 R/C Engine
Total list value $117.45 PRICE $76.00

Top Flite CONTENDER, 54" and McCoy .40 R/C Engine
Total list value $65.90 PRICE $44.00

V-K CHEROKEE, 65" and Fox Eagle .60 R/C Engine
Total list value $106.90 PRICE $73.00

V-K BABY CHEROKEE, 53" and Fox .36 R/C Engine
Total list value $56.45 PRICE $38.00

R/C EASY FLIERS

Jensen DAS UGLY STICK, 60" and Fox Eagle 60 R/C Engine
Total list value $114.90 PRICE $79.00

Midwest SWEET STIK, 54" and McCoy 40 R/C Engine
Total list value $61.90 PRICE $42.00

Midwest CARDINAL SQUIRE, 74" and McCoy 40 R/C Engine
Total list value $80.90 PRICE $55.00

R/C STAND-OFF SCALE

Take your choice of:
Top Flite P-51 MUSTANG, 60" or Top Flite P-40 WARHAWK, 60" or Top Flite P-39 AIRACOBRA, 60" and Fox Eagle .60 R/C Engine
Total list value $114.90 to $117.45 PRICE $79.00

NEW! Stainless Steel PRECISION STRAIGHT EDGE with cutter $2.98

Lays flat -- it's thin and heavy, 26" long, 2" wide with stainless steel accuracy. Great for cutting Monokote, balsa, or drawing lines.

Malco A-TAK $49.00

The underpriced balsa "A-R-F" that we've shown in our ad before. Here's a little bit better photo of the finished product. 50" span, fully balsa sheeted foam wings, prebuilt fuselage -- a steal at 49 bucks.

TRY US OUT: B. B. did.

"I must compliment you people on having the finest array of hobby merchandise available, as well as the best prices I've come across. Your merchandise list reads like the Sears catalogue of the hobby industry. I've just about given up local hobby shops, because I can get what I want from your shop much quicker."

B. B., Rutland, Massachusetts

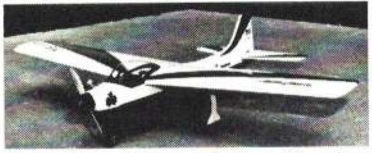
NEW! Sig "DOUBLER" 1/4 MIDGET RACER

List price $12.95 **SPECIAL $10.97**

This rather ancient and inexpensive kit won the 1/4 Midget "Nationals". Of course, it had a super qualified pilot—Austin Leftwich—but, at least it's nice to find an inexpensive, all balsa Kit that you can put your screaming .15 into and go Quarter Midget racing.

NEW! Sig KOMANDER (Aileron trainer plane)

List price $29.95 **SPECIAL $26.97**



This well-thought-out Kit has some built-in (shoulder wing) roll stability, and a torsion bar landing gear that's designed to absorb the shock of novice type "landings". KOMANDER has a 62" span and takes a .35 to .50 size engine and doesn't look like a "trainer".

NEW! Ace R/C WHIZARD

$17.95

Here's Ace's latest foam wing plane. 40" span for .049 engine and 2 channels. Somehow everything "clicked" in the design of this airplane and it'll out perform many larger ships. I often wonder if you read down to the fine print in these ads so we'll throw in a free McCoy .049 engine if you'll mention it when you order this sharp little plane (until February 28, 1974, that is).

Series III

HOBBY LOBBY 5
Digital Proportional

We're afraid to change it!

- Unsurpassed reliability
- Extremely Long Range
- Full 90 day Warranty backed by the manufacturer and by Hobby Lobby
- Smallest, Lightest, Servos made
- A Complete system; Transmitter, Receiver, 4 servos, all n-cads, charger, 27 or 72 mhz
- Extra servos cost only $13.00
- I. C. FULL-POWER servo amplifiers
- Only 11 ½ oz. airborne weight
- Reliable Airborne battery pack with ONE-CELL-OUT flight ability
- PRICE: About HALF of what you'd expect to pay for a top quality 5 channel system.

It has become a pretty well-accepted fact among knowledgeable RC'ers that there have been "vintage" years for various radio systems. As digital proportionals have evolved to their present state, a great deal of trial and error was involved. But certain systems from specific years' production of various manufacturers have been ahead of their time in terms of reliability and accurate performance.

During the summer of 1973 we began to realize that we had a "vintage" model in our SERIES III Hobby Lobby 5. The reliability was tops – the best we'd ever seen in any brand of radio – and the performance began to be discovered by the more sophisticated RC flyers to whom the SERIES III's tight control stick-to-servo resolution, and its ability to preserve their complex contest planes through a long flying season are the criteria for judging a radio system.

Series III
HOBBY LOBBY 5 Digital Proportional $209

We will continue the SERIES III Hobby Lobby 5 absolutely unchanged for 1974 simply because we can not think of any change that would improve either its accurate performance or its superb dependability.

Here's Hobby Lobby's New 3 Channel Radio. *Add up what its features are worth,* then see if you believe the price!

- ★ ULTRA-LIGHT airborne WEIGHT: 6.5 ounces with 2 servos, and 225 mah. batteries; 8.8 ounces with 2 servos, and pencell batteries
- Excellent SERVO RESOLUTION and CENTERING for CONTEST work
- ★ I. C. Servo Amplifiers with ONE-CELL-OUT flight capability
- ★ Smallest SERVOS made
- ★ A COMPLETE, ready-to-operate outfit: 3 channel Transmitter, 3 channel Receiver, 2 Servos, Airborne battery holder & switch
- ★ Same FAR-REACHING Transmitter power as the Hobby Lobby 5
- ★ Precise 2-axis Control Stick
- ★ Same selective and sensitive Receiver circuitry as the Hobby Lobby 5
- ★ *PRICE: About HALF of what you'd expect to pay for a top quality 3 Channel radio*

The Hobby Lobby 3 is a ready-to-operate 3 Channel Digital Proportional outfit, consisting of a 3 Channel Transmitter, a 3 Channel Receiver, 2 Servos and airborne battery holder and switch.

The Hobby Lobby 3 is manufactured for Hobby Lobby by the same company that makes the unusually reliable Hobby Lobby 5 proportional system. Many items are common to both systems: the servos...HL 3 uses the same servos as the HL 5 Series III 5th Channel servos, and the optional airborne nickle-cadmium battery packs are interchangeable between both systems.

With its optional 225 mah. nickle cadmium airborne battery pack, the Hobby Lobby 3 is one of the true ultra lightweight systems.

The precision of the control stick-to-servo, the 3 ½ pound servo thrust, the out-of-sight range, and the proven reliability record of the circuits used in the system combine to make the HOBBY LOBBY 3 the finest 3 channel system available regardless of price.

HOBBY LOBBY 3
3 Channel
Digital Proportional

$89.00 (27 mhz, 2 servos)
$99 (72 mhz, 2 servos)

27 mhz. HOBBY LOBBY 3 available November 1, 1973.
72-75 mhz. HOBBY LOBBY 3 available January 1, 1974.

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Uplift

WYOMING MIDDLE SCHOOL: A CLASS IN MODEL AVIATION MAKES FOR A FUN DAY. / by James Miller

Model airplane building received a shot in the arm in an activity period at the Wyoming Middle School, Wyoming, Ohio (suburb of Cincinnati). The non-academic period, held for two 45-minute periods each week, is under the guidance of Jim Miller, a member of the South Western Ohio Free Flighters (SWOFF).

Students range in age from 11 to 13 years. Most of them have no experience in building free flight models and are not used to working with balsa. Two objectives of the program naturally evolved. First, we had to find a progression of simple models that would fly well and engender enthusiasm. Secondly, these models had to provide a means for learning the fundamentals of building beginning with the simple glider and progressing to the more complex rubber-powered model.

After some experimentation, the program was centered around models kitted commercially plus those kitted by Jim taken from magazine plans and designs from other modelers. Models that have proven to be particularly useful are: Ernst Johnson's basic gliders; Frank Zaic's G-12, X-12, and X-18; the Delta Dart, AMA Racer, Sig's Cub and Tiger; Tern's Lil' Dipper, and Dave Lindstrum's Rapid ROGer.

Over the two-year period, as many as 100 different students have been exposed to model airplane building. About 50 students have followed the program for a year. Of the fifteen builders who have continued for the entire two years, several have entered area contests and many have won trophies. Plans are under way for organizing a club at the high school for those students who are interested in continuing in more challenging projects in aeromodeling.

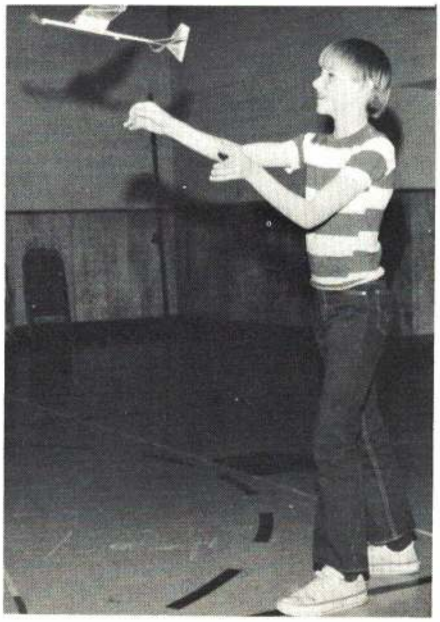
Anyone interested in starting a similar program should send a stamped self-addressed envelope to James I. Miller, Wyoming Middle School, 17 Wyoming Ave., Cincinnati, Ohio 45215.

Jim Miller answered the students' many questions.

Modeling is a great group activity. Youngsters are able to see the advantages of a cooperative group effort.

Make sure the facilities are adequate and properly ventilated.

It's always best to start with basic models—the chance for errors is diminished and confidence is built.



Concentration is the name of the game. You could almost hear a pin drop.

The proof is in the flying. The expression on this boy's face tells it all.

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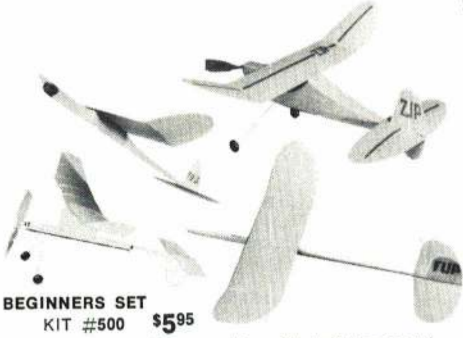

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CARDINAL KIT # 404 $1.95

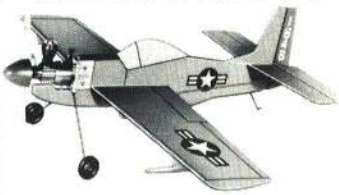
BIRD-DOG KIT # 405 $1.95

CITABRIA KIT #·406 $1.95

PIPER CUB KIT # 407 $1.95

Color printed and die cut balsa. Pictorial easy to follow plans. Wire ready formed. Simple to build. 20" span.

U-CONTROL



MUSTANG KIT # 251 $3.95

MESSERSCMIDT KIT # 252 $3.95

AIR COBRA KIT # 253 $3.95

WARHAWK KIT # 250 $3.95

Clean die cut balsa, formed wire, color decals, tough plastic easy to fit engine and gear mount. Easy to fly. 21" span.

RADIO CONTROL

TRI SQUIRE KIT # 106 $19.95
Stable all die cut balsa trainer.
.09-.19 engines. Straight forward plans.
Handy 52½" span. Lots of room inside.

CARDINAL ARF KIT # 125 $23.95
Tough, all molded foam trainer for .049-.15 engines. Single channel to full house. Quick build-easy to fly. 46" span.

SUPER CHIPMUNK ARF KIT # 126 $24.95
Exciting all molded foam model of Art Scholl's famous 'plane. Strong, easy flyer 46 in. span. Engines .10 to .19.

GLIDER

JETSTREAM KIT #·303 $6.95
48 in. span, simple contest glider to A1 Class. All die cut balsa. Covering supplied. Optional power pod for .010.

LIL "T" KIT #121 $18.95
Big 74" span soarer for tow, slope or hi-start or use power pod. Self aligning construction. All balsa—easy to build.

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ON THE SCENE

UNITED PYLON RACING CIRCUIT CHAMPIONSHIP.

by Kent Landefeld

Before announcing the race results, I feel some background on our circuit is in order. The circuit consists of the following clubs: Erie County Model Aircraft Association, Inc., Radio Control Club of Rochester, Inc., Niagara County RC Model Airplane Club, Inc., Jamestown Flying Aces, Inc., Olean Model Airplane Club. Last year each club held two races—ten in all. Events consisted of: **SPORT PYLON:** Any typical Stunt type model using normal power for its design. No Open Pylon Specials allowed. Questionable models may be entered in Open Pylon if they meet AMA rules. **OPEN PYLON:** Flown to AMA rules. Typical—15% thick wing; 29 engine needs 450 sq. in.; 40 needs 500; 50 needs 575; 60 needs 610. **FAI/ FORMULA II:** Raced together. FAI airplanes use FAI rules. Formula II airplanes use AMA rules. **FORMULA I.**

Points are awarded based on number of entries for each event. For example, with ten entries, the first place winner earns ten points, second place, nine points and so on down to tenth place, one point.

Awards are given to the individual event winners. There is an overall award for the contestant who gains the most points during the year.

For the second year in a row, the weather for our championship race was terrible. Rain both days and 35 mph winds on Saturday.

At the start of racing on Saturday, several fliers in the Sport and Open Pylon events were in contention for the individual event championship.

When the smoke cleared, Rick Paine and Dave Kelly, both from Canada, and John Grigg of Lockport, New York, were in a three-way tie. A flyoff was scheduled for the next day. Fortunately, there was no frequency conflict and the three went head to head in three heats. John Grigg won all three. His best time was 2:07.

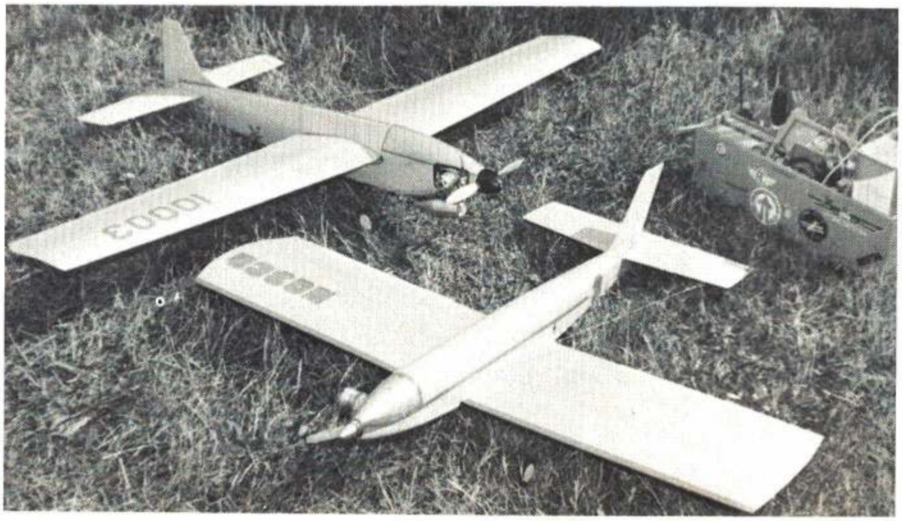
Open Pylon produced the same situation. Again, a flyoff was scheduled between Canadians Phil Viney and Steve Nagy and Al Heminger of Dunkirk, New York. Phil Viney won all three heats by a small margin. Phil and Al's planes were equal in speed. However, Phil flew a little tighter and came out on top. Steve had engine problems every heat and wasn't in contention. John Grigg who missed qualifying in Open by a few points, probably had the fastest Open ship at the meet, turning a 1:57 on Saturday.

(Continued on page 111)

Photos by D. Gierke

Co-champions Kent Landefeld (left) and Ernie Nikodem hold their mutual trophy. Phil Viney (left bottom) and John Grigg hold the birds that garnered them Open and Sport Pylon champ titles respectively.

ABOVE: Bill Zaunter takes a tach reading on his OPS tuned piped FAI bird. Bill turned a 1:39. Byran Sattler assists. BELOW: John Griggs originals—in foreground, his Open Pylon Special which flew him to a championship. Behind, John's Sport Pylon plane turned 1:57 for best time of the meet.



ABOVE: Dick Smith of Rochester, N.Y., tunes up his Formula II Firecracker. BELOW: John Grigg won all three heats of three-way flyoff in Sport Pylon with his original design. Canadian support of the United Circuit is very strong.

Choose Heathkit 3- or 4-channel... YOU CAN HANDLE IT!

3-Channel System with 4th channel option installed

3-Channel System

Get your hands on the new Heathkit GDA-1057 Systems and you fly with dual-axis stick control, and a super slim case with comfortable adjustable hand strap. And what is initially a neat 3-channel transmitter, easily becomes a 4-channel unit with the simple addition of an optional modification kit. That way you can order 3 now, add the fourth later. Or order 4 to begin with.

The Heathkit GDA-1057 System uses the flight proven circuitry found in the popular Heathkit GD-19. The GDA-1057-1 3-Channel Transmitter comes with a 2-axis stick assembly. Add the GDA-1057-4 modification and put 3 channels on the stick with the fourth controlled by a thumb tab. The GDA-1057-1 Transmitter is available on all R/C frequencies, and is housed in a slender new case for positive one-hand action during launch or engine adjustment. Other top-flight features include all nickel-cadmium battery packs with external charging unit, vinyl-covered front panel, telescoping whip antenna, and relative power output meter that doubles as a battery-charging indicator. The new compact GDA-1057-2 3-Channel Receiver has a molded nylon case and connector block for servos and receiver battery pack. It's compatible with all Heathkit servos, and the GDA-1057-4 mod kit converts it to 4-channels too.

SPECIAL SYSTEM PRICE #1 — Order 3-Channel Transmitter, Receiver, Receiver Battery, two GDA-19-4 Standard Servos, $139.95.*

SPECIAL SYSTEM PRICE #2 — Order same system as above, substituting GDA-405-44 Miniature Servos, $149.95.*

SPECIAL SYSTEM PRICE #3 — Order same system as above, substituting GDA-505-44 Sub-miniature Servos, $149.95.*

Available on all 3 frequency bands. Specify frequency when ordering.

Kit GDA-1057-1, 3-channel transmitter, 4 lbs.	**74.95***
Kit GDA-1057-4, 4-channel modification pack for both transmitter and receiver, 1 lb.	**19.95***
Kit GDA-1057-2, 3-channel receiver, 1 lb.	**34.95***
Kit GDA-405-3, receiver battery, 1 lb.	**9.95***
Kit GDA-19-4, standard servo, 1 lb.	**19.95***
Kit GDA-405-44, miniature servo, 1 lb.	**24.95***
Kit GDA-505-44, sub-miniature servo, 1 lb.	**24.95***

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LEW McFARLAND ON CL

Greetings With Introduction: Lew McFarland here, first loop in 1948 with a Jim Walker Fireball and still "looping." The family consists of Donna, a patient and tolerant wife, and sons, Russ (14) and Steve (4). Perhaps a list of involvements rather than accomplishments are in order to justify my new position. Contributing Editor means an obligation to CONTRIBUTE something that is worthwhile to **AAM** and our event, STUNT (short for CL PRECISION Aerobatics). (1) Contest Oriented—Some fifteen Nationals (placing first to 12th), two U.S. World Championship teams, two USAF World Champions, two King Orange Championships are to my credit. I was also Contest Director for some five Mid-America Championships. (2) Design Oriented—At least ten competition Stunt designs are mine of which at least five have been published and/or kitted, e.g., Shark 45, Dolphin, Ruffy and maybe some day Lew's Akromaster. (3) Club Oriented—I am a charter member and current President of Lexington MAC, totally involved in obtaining and developing two different club flying fields. (4) Product Oriented—Currently a hobby shop owner, I also have a few commercial hobby involvements that reach to England and Germany. (5) And, we all have to make a living, so professionally I am a pharmacist.

After This Column: I plan a continued effort to be a DIRECT REFLECTION of reader interest. There will be room here for pointers for the beginner or novice Stunt pilot, but also for the active exchange of information among highly competitive individuals. Stunt enthusiasts have friends all the way from the Philippines to Saudia Arabia and there always seems to be one just down the street. They are a great bunch of fliers. PLEASE send appropriate contributions TO: Lew McFarland, P.O. Box 8177, Lexington, Ky. 40503.

Improve Performance: There is no one who could not improve performance (score, if you prefer). One suggestion—try our local experiment: Seek out those who want to work on improvements; cooperate within the local group to form an adoption system in which more proficient fliers and builders adopt those further down the ladder to give them help. This is done all the way down until the rank beginner has some one to give him personal assistance. End result—a thorough and complete dissemination of information. Don't be surprised if there evolves some new and useful building and flying techniques with improvement for all.

Lew McFarland with his famous Akromaster. Latest design from a reknowned and respected Stunt flier.

Hobbypoxy finish brought Carlos Aloise of Los Angeles the highest finish points in Sr. Stunt at the '73 NATS.

Gene Schaffer (N.Y.) gives signal to start the flight that took second place at '73 NATS. Gene qualified for the World Championship team.

Mr. Ken Stevens and son Kenny. Kenny (holding his Oriental) has consistently placed third at the last three NATS in Jr. Stunt. That's a rather nice rut to be in!

The ultimate would be a Video Replay setup so the flier could see the flight as if he were sitting in the judge's seat. Does this provoke a thought? Why not use a Video Replay as a judging aid. This would cut out some of the human error. Angles (heights) could be inscribed on the screen and radius of turn could also be measured; there would be no doubt how close the tracking was. Johnny Clemens used to suggest that every one stay home and mail their scores in; this way we could mail in our flights.

Johnny also tells a story about the time he got a Sabre Stunt too low inverted, causing the rudder to touch the ground. So he gave some down to go up, but without luck. It kept on dragging. So more down, etc., until at last the prop touched. Upon inspection, the rudder was missing Johnny and cohorts searched to no avail. Then someone discovered the circle of balsa dust on the runway. Well, it was funny when Johnny told it. . . .

(Continued on page 101)

DON LOWE ON RC

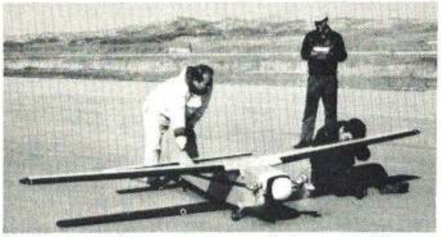
RC At Work: Korea—Bob May, a G.E. representative, is working with several members of the Seoul, Korea RC Club to develop and manufacture target-towing drones and camera planes. Bob is serving as technical advisor and purchasing agent for the group. We have been in contact primarily because of the Teleplane project and technology spinoff possibly useful to the ROK project.

The craft shown in the photo is a prototype which meets the requirements. It weighs about 20 lb. Power was supplied originally by OS 80s, but has been converted to a single 90 cc gasoline engine.

The craft has a very unique control system. It has a gyro autopilot and compass heading device; both are controlled by a timer and cassette tape recorder.

In a normal flight, the plane takes off, is trimmed and set on a compass heading. Then it is switched to autopilot. Later, a timer activates and the ship flies out of sight. At a predetermined time, the cassette is turned on by the timer and the recorder switches off the autopilot, causing the plane to reverse heading, then switches itself back to autopilot and shuts itself off. While all this is happening, the Korean team builds a fire, cooks and consumes a pot of rice, smokes cigarettes and relaxes for a while. Soon the pilot on the team stands up and spots the plane across the horizon on its return flight. As it comes into range, he switches off the autopilot, takes command of the plane and brings it in for a beautiful landing.

Bob says that this may all seem unbelievable, but he has witnessed it on numerous occasions. Verrrrry ingenious, these modelers, no?



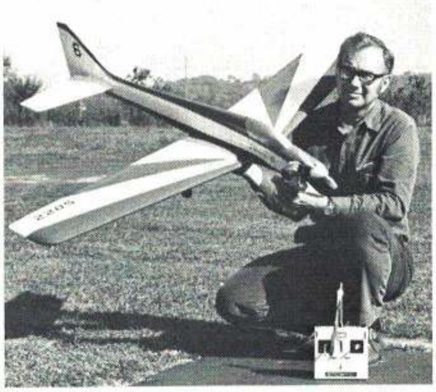
Aircraft developed for ROK Army in Korea for target use and for carrying cameras.

National Society of Radio Controlled Aerobatics: Rhett A. Miller who is heading up this fledgling aerobatics organization indicates that it's off the ground. Membership is open to all for $4 per year. (Membership includes newsletter.) To join, write to Rhett A. Miller, 3039 Lakeshore Dr., Tallahassee, Fla. 32303; or phone: (904) 385-4957.

This organization is dedicated to furthering the cause of RC aerobatics and has already gotten in some licks on proposed FAI rules changes. With all the proposals for changes in Pattern floating around these days, we should support a cohesive effort in this regard.

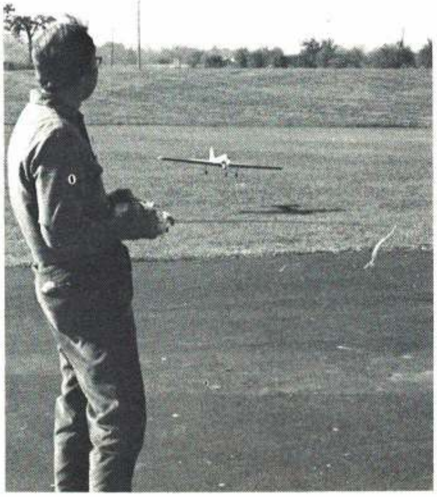
The Continuing Saga of Joe Flier, Boy Expert—Episode No. Three: If you will remember, last time, friends, Joe Flier was involved in accomplishing (with unbelievable skill) the

(Continued on page 98)



My latest effort—Phoenix 6—is now being kitted by Airborne Associates. It's a future AAM feature.

The Phoenix 6 is stable and easy to fly, and lands fairly slowly. An ST Bluehead yanks it real well.



1973 World Pattern Championships

Gorizia, Italy, on the Austrian border, was the site of this year's World Championships. After five days of superb flying by all, the Japanese emerged victorious.

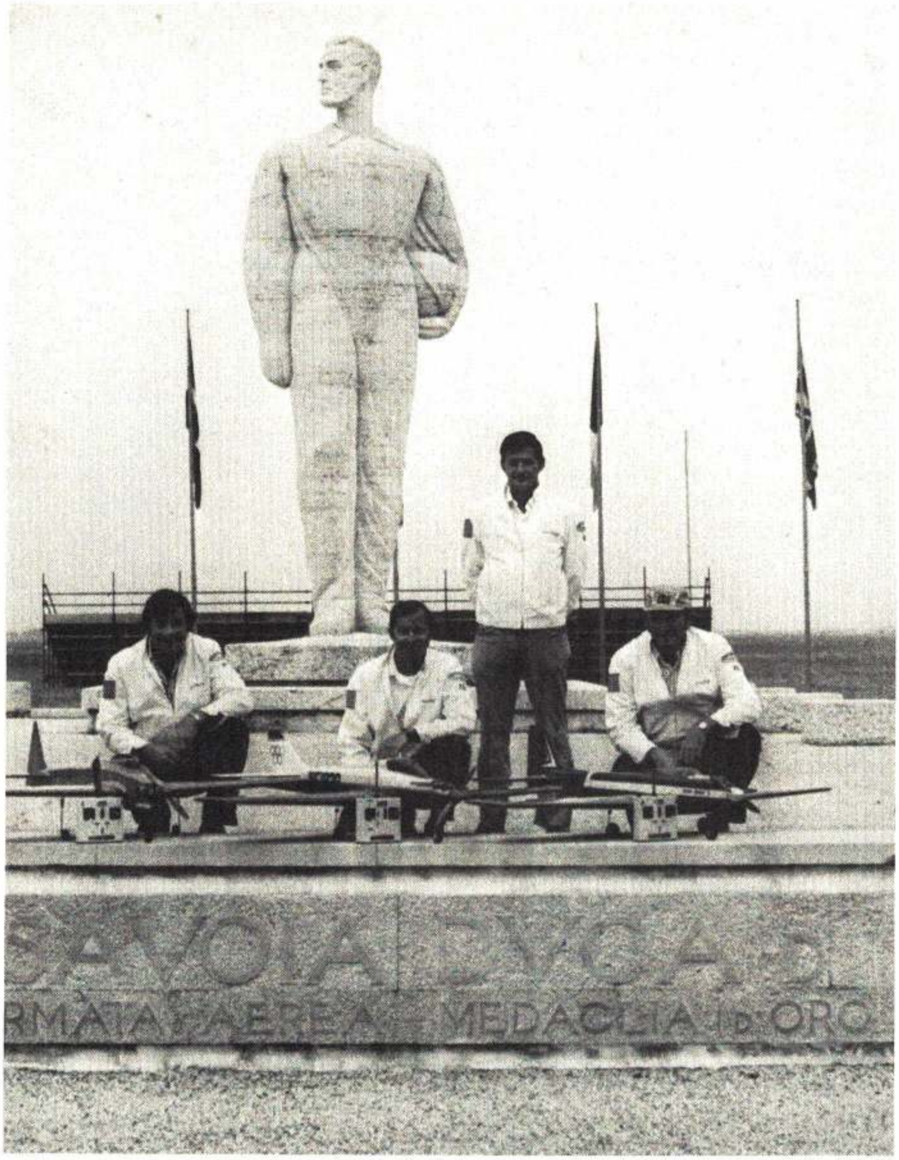
by Jerry Nelson

The Italian Aero Club and the local model club in Gorizia deserve a tremendous amount of credit for hosting a very well organized 1973 World Competition, Sept 11-16. The flying site proved to be quite good except that most aircraft ran into the grass and dirt at the edge of the flying circle. Since landings were not to be downgraded for this and it was the same for all, the problem really didn't matter. An interesting stoplight system connected to a central frequency monitoring system proved to work quite well. If there was interference on the frequency of the flyer, the red light would be turned on. The pilot had one min. to decide whether to continue his flight or land and take the entire flight over. If the frequency was clear, the green light would be turned on. Both circles had such a light system.

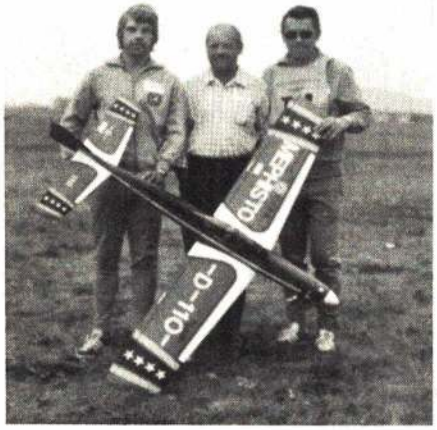
The competition consisted of the regular FAI Stunt schedule with a total of four rounds flown. The top five then flew two flights with the total of both flights counted as their score. There appeared to be some disagreement among the competitors on this system. Most felt that there should be more fliers in the final flyoff. Eliminate those fliers who were obviously not competitive yet still allow them to try. We could use a system similar to the one we have utilized at our Nationals: A shorter flight schedule and a flyoff for the top 20. Fliers from several different countries would probably have had trouble competing in a local meet in the A or B Patterns.

The finals qualification system proved to be advantageous for first place winner Tsugutaka Yoshioka, but not for third place winner Hanno Prettner. Prettner's flights during the four qualifying flights were consistently very high (all over 4000 points). He didn't even have to make his fourth flight since no one could beat him with a high fourth round flight. Yoshioka's fourth round flight was a real boomer of a score that easily put him into the finals. Second and four place winners, Wolfgang Matt (Liechtenstein) and Harald Neckar, qualified easily, with Norm Page just making the fifth spot.

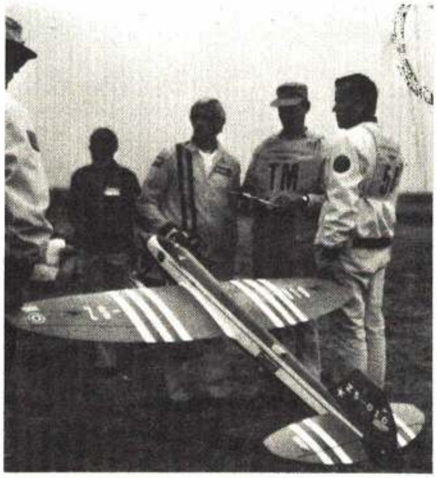
The new World Champ, Tsugutaka Yoshioka of Japan, expresses satisfaction with the final flight score which gave him the 1973 crown.



U.S. Team took second place team honors. (Left to Right), Jim Martin, Norm Page, Ron Chidgey (team coach) and Jim Whitley.



Harald Neckar (Germany) with his Mephisto. Highly detailed finish, full flying stab, and German HB 61 engine highlighted this fourth place model.



Louis Brink (South Africa) holds the right wing tip of his elliptical Novi Arrow. Webra 61, eight lb. with 625 sq. in. of wing, this eye-appealing design will be a future AAM plan.

The weather during the qualifications was very good with very low winds and mild temperature conditions. Weather on Sunday during the final flyoff was excellent with almost no wind.

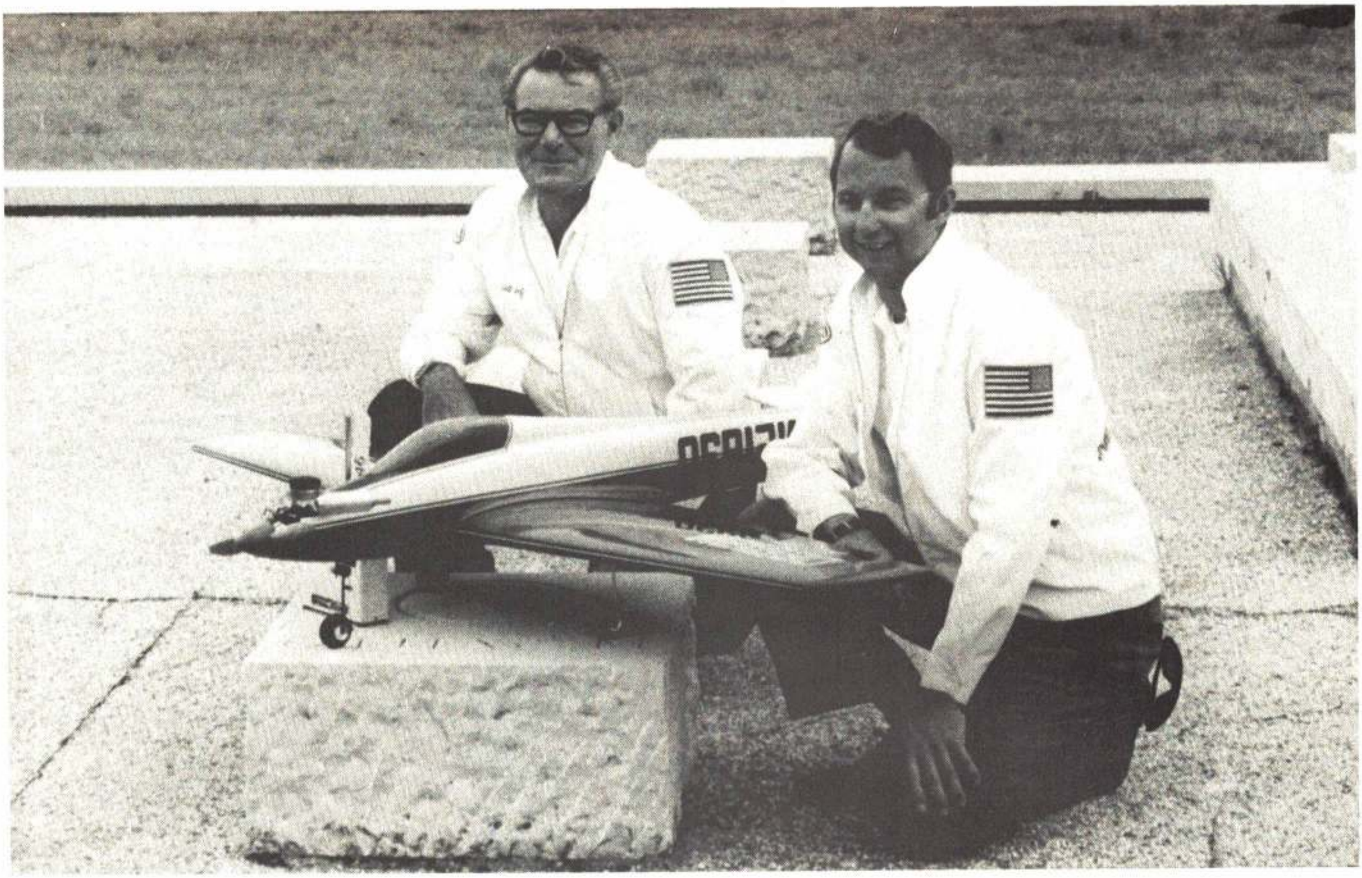
Neckar was first to fly. His flight was well done, however, minor errors such as heading changes and missed crossover points were noticeable. Not bad for the first flight. Prettner was next with also a very good flight, obviously better than Neckar's. Positioning was excellent, but the aircraft was looking for neutral all the time. It was learned later that his caller (his father) called the landing pattern maneuver prematurely. Prettner was in the process of turning around when the maneuver was called; this gave him a zero for the rectangular pattern maneuver. Deep down inside, Prettner must have known it was next to impossible to win the championships with a zero for a maneuver, especially for a relatively simple maneuver.

Matt next put in a complete flight equal or better than Prettner's. Headings, positioning and the rock solid level flight were excellent.

Page had trouble starting due to a burned out glow plug. A second plug was installed, but also burned out. Finally, after the third plug was installed, the engine started and the model rushed into the air. The extra time used to start the engine proved to be a problem later on in the flight. Final maneuvers had to be rushed. Less than five sec. were left after the landing. His flight went well, especially the rolling maneuvers for which Norm is famous. His score was satisfactory, providing that his second flight could be better. Yoshioka's flight was very smooth, but obviously received a lesser score than Prettner and Matt. Nonetheless, the judges' scores at the end of the first round didn't seem to agree with our evaluation of the flights. Neckar's flight was highest, followed by Yoshioka's. Page placed third, then Matt and Prettner. This was Prettner's first flight below 4000 points in world competition.

Neckar's second flight was not quite up to the quality of the first flight. It was very professionally executed, but it didn't have that little extra polish. It seemed as though he wouldn't be the champion. Prettner's flight was up to his standard. Perhaps it was his best flight, but it had to be almost a perfect flight to make up for the first flight's zero. We were hoping that Norm Page would put in that boomer of a flight of which he is capable. This time the engine started perfectly. His first maneuver, the Figure M, turned out to be a disaster. It flipped over on the first stall turn giving a very low score. This didn't appear to shake him up because the remainder of the flight went very well with perhaps even a few tens. However, the spin was very poor with a bad recovery. It appeared that it wouldn't be possible for Norm to come out on top. Matt seemed to be favored to win. His flight was a repeat, or perhaps even better than his first flight. Very smooth and precise with excellent positioning and altitude control.

(Continued on page 91)



Plagued by blown plugs, rushed flights, a faulty maneuver and a Pattern style which the judges didn't find appealing, Norm Page managed to fly through all this to a well-deserved fifth place. Norm had only a few weeks of flying on his bird before his trip to Italy.

Hanno Prettner (Austria) took third place with his Super Sicroly. This year, his ship featured a unique flap arrangement. Webra 61 Speed for power.

Yoshioka's winning model illustrates superb craftsmanship common to all Japan's entries. High degree of wing sweep by U.S. standards, yet an otherwise straightforward design. AAM will publish a full construction article on this design in the future.

CARL MARONEY ON RC

1972 CIAM Plenary Meeting: Good news for soaring enthusiasts—changes to the FAI Class A Provisional Soaring rules were submitted by AMA. The U.S. agenda proposal contains a new section "e" under sub-paragraph 1.4.: Cancellation of a Flight or Disqualification. The flight is annulled if the glider is not released from a towline within 60 seconds after release of the glider by the launcher." The reason for the change is due to omission of a penalty for failure to release within 60 sec. in Paragraph 2 of the Class A rules for thermal soaring gliders.

1973 LSF Tournament: This report is based on information taken from *The Pacific Breeze*, a newsletter prepared by the Pacific RC Soaring Association. The 1973 LSF Contest was different from the usual run-of-the-mill tournament. It featured three flights over a one-mile course and three two-minute precision rounds as part of the two-day program. Also, there was no established flight order. Instead, one flier placed his plane in line behind his frequency color marker and, when the flag was returned, the next in line launched his sailplane. The object was to permit each contestant to complete three flights on Saturday in order to fly on Sunday. Needless to say, no one was willing to sit around waiting for that big boomer to come through. Once airborne, each pilot was allowed a minute to decide which task he would attempt to accomplish. If conditions were right and a good launch for altitude was achieved, most pilots would attempt the one-mile task.

Several pilots lost their ships downwind. After some brain searching, it was concluded that the steel used to reinforce the asphalt runway caused damping of the transmitted signals. The one-mile record time of 97 sec. was set by Rick Walters who was flying a modified White Trash sailplane.

Buck Faure, President of the Torrey Pines Gulls, was overall winner with a stretched and loaded Windfree sailplane increased to a 12-ft. wingspan. Contestant Ken Willard commented that Faure's ship should have been renamed the Presbyterian since it was on Sunday and Buck should have been in church.

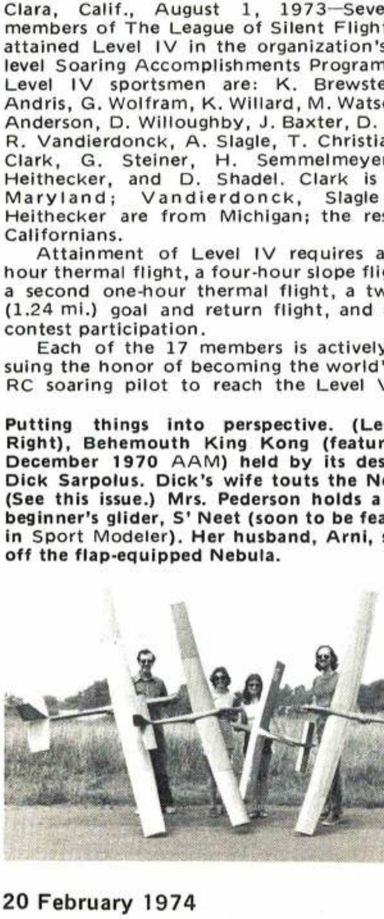
During the two competitions, six teams from all parts of California were shooting for the number one team position with the Torrey Pines Gulls coming out on top.

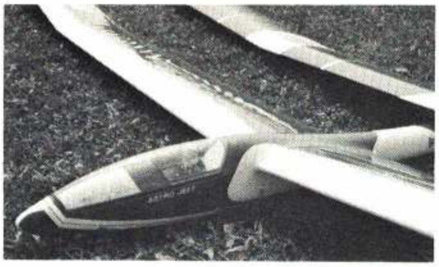
LSF Members Push Soaring Skills: Santa Clara, Calif., August 1, 1973—Seventeen members of The League of Silent Flight have attained Level IV in the organization's five-level Soaring Accomplishments Program. The Level IV sportsmen are: K. Brewster, R. Andris, G. Wolfram, K. Willard, M. Watson, L. Anderson, D. Willoughby, J. Baxter, D. Lillie, R. Vandierdonck, A. Slagle, T. Christian, D. Clark, G. Steiner, H. Semmelmeyer, O. Heithecker, and D. Shadel. Clark is from Maryland; Vandierdonck, Slagle and Heithecker are from Michigan; the rest are Californians.

Attainment of Level IV requires a one-hour thermal flight, a four-hour slope flight or a second one-hour thermal flight, a two-km (1.24 mi.) goal and return flight, and active contest participation.

Each of the 17 members is actively pursuing the honor of becoming the world's first RC soaring pilot to reach the Level V pinnacle. Level V is expected to take about two years to complete for a total of some five years of work from the Level I membership qualification. The Level V status requires documentation of a two-hour thermal flight, an eight-hour slope flight, a 10-km (6.21 mi.) goal and return flight, as well as considerable success in major soaring competitions.

Putting things into perspective. (Left to Right), Behemouth King Kong (featured in December 1970 AAM**) held by its designer, Dick Sarpolus. Dick's wife touts the Nebula. (See this issue.) Mrs. Pederson holds a basic beginner's glider, S' Neet (soon to be featured in** Sport Modeler**). Her husband, Arni, shows off the flap-equipped Nebula.**





Young Jeff Mrlik's Astro-Jeff. (We finally found out how young Jeff really is!) Jeff is soon to appear in AAM.

Pattern Flier Ed Izzo and his wife, Lou, take time out from the rat race of speed, castor oil fumes and precision maneuvers to match wits with Mother Nature in the realm of silent flight.

Membership in the League can only be earned. There are no membership dues or fees. To become a member, an RC sportsman must first register as an aspirant declaring his intent to work toward membership, and then fulfill the requirements of Level I: A five-minute thermal, a 15-minute slope flight or a second five-minute thermal flight, and five spot landings within three meters (9.84 ft.) of a target point.

Advanced levels in the Soaring Accomplishments Program are progressively more challenging. Many members have reached status beyond the basic Level I: 125 are at Level II and 38 are at Level III.

The League of Silent Flight is an international association of RC soaring enthusiasts which has attracted approximately 700 members. A membership of 1000 is projected by early 1974.

The LSF is an organization for the individual sportsman. Its Soaring Accomplishments Program is a personal challenge. Any serious sportsman is invited to associate with the League and work toward membership. Requests for information and other communication should be directed to The League of Silent Flight, Box 2606, Mission Station, Santa Clara, Calif. 95051. All correspondence to the LSF should include at least 16 cents in stamps for return postage.

BOB MEUSER ON FF

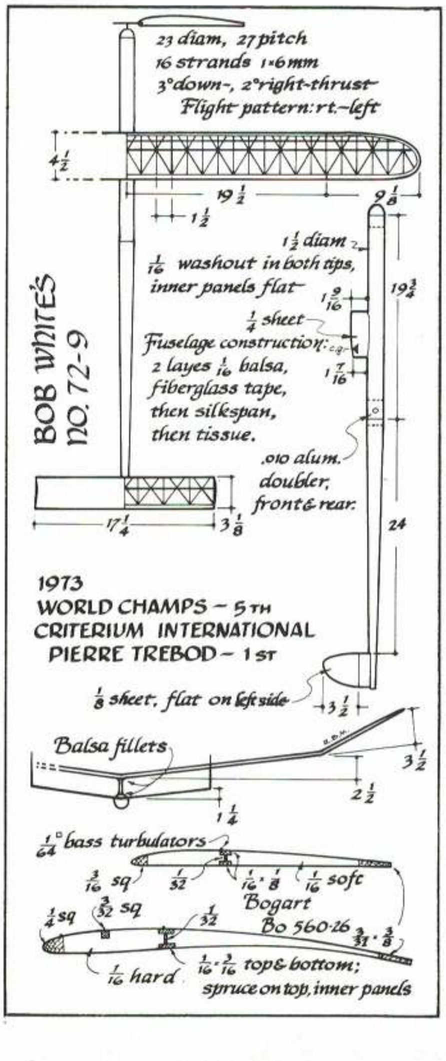
Bob White Wins International Meet: Shortly after competing in the World Championships, Bob White and two other U.S. team members entered the Criterium International Pierre Trebod in France. Competing against 52 of the world's best Wakefield fliers. Bob won.

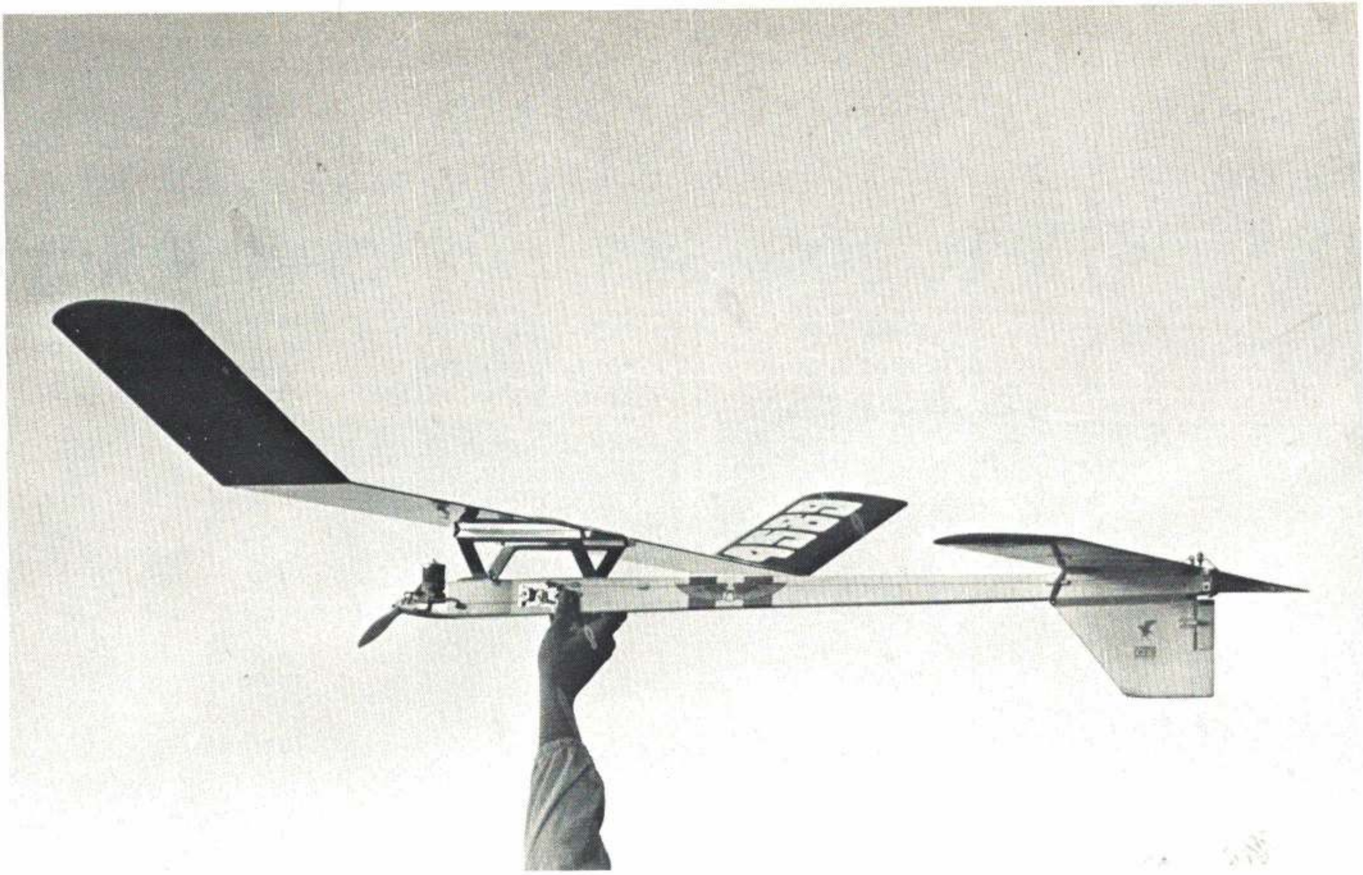
The other U.S. team members didn't do badly either. Jon Davis dropped one max in Wakefield and finished ninth. Tom McLaughlin, competing against 34 others in Power, made it into the 13-man flyoffs along with the U.S.'s Roger Simpson, stationed with the Air Force in Europe. In his attempt at a third flyoff flight, Tom was unable to start his engine within the allowed two min., and finished eighth. Tom hand-cranked his engine, while most others used electric starters.

Koster of Denmark maxed on his third flyoff flight and won. Only two made the flyoffs in Wakefield. Bob maxed on his first flyoff flight while Du Puis of France made only nine sec. There were 97 entries in Nordic glider, seven of whom maxed on all seven regular flights to qualify for the flyoffs. There again, the first flyoff flight was the deciding one; Le Page of France won with a flyoff flight of 209 sec.

White has competed in the World Championships twice and has done well both times: 5th in 1973, 3rd in 1971 out of over 70 of the world's best. The flyoff flights often take place late in the day when there is no thermal activity, so still-air performance is often the deciding factor. This wasn't true in 1973 during the Wakefield flyoffs. During the four-min. period in which those flying off must wind and launch their models, a small thermal drifted by the end of the line of contestants, and those at the end were able to launch their models into it. Bob was positioned farther up the line and thought conditions at his position might improve, so he delayed launching. In retrospect he feels he would have done better had he launched crosswind and attempted to catch some of the lift at the end of the line.

Bob commented that the Europeans build excellent models and take their modeling quite seriously. Their models are capable of good performance in still air. They are equally adept at finding their own thermals and at piggybacking—a bit of an art in itself. Our power models climb as well as theirs, but theirs glide better. Their towline gliders equal ours, but they do a better job of flying and controlling them. The Soviets' circle-tow technique has been highly developed. On his winning flight at the World Champs, the Soviet circled his model directly overhead. When it was released, it continued in a tight upward spiral gaining enough additional altitude to top the other contestants' flight





The Strutter by Dick Lyon is the fifth in this design series for FAI Power. Why the strutted pylon? We'd guess that this reduces the effective side area up front and is also more rigid.

times. "Picking air"—knowing the right time to launch in order to catch a thermal—is easier in Europe than at his home field at Taft, albeit quite different, according to Bob.

I was surprised to learn that Bob hadn't used some of the fancy models he had with him at Taft earlier in the year—the ones with prop spinners, high aspect ratio wings with extremely thin airfoil sections, and one with a solid balsa wing. Of the six models he took to Europe and practiced with for several days, his more conservative 72-9—the one shown in the three-view—climbed better, and he developed more confidence with it. He allows that perhaps the newer models have a better glide in still air. But a model is a very personal thing, and if you just don't feel right about one, there is no use trying to fly it in a World Championship.

White has tried many different prop designs, and to date has had the best results with the prop on his 72-9. Even when that prop was used on his newer models they climbed higher than with his new props. He uses very thin blades carved from very hard balsa, a Z-shaped wire hub, a 1/64-in. sq. basswood turbulator on the top surface, a Schwartzback pitch distribution (see October 1970 **AAM**, page 36), and a Lennart Flodstrom blade outline. The wire hub is twisted to adjust the pitch until a 30-sec. motor run is obtained. Perhaps we can present more complete details in a future issue.

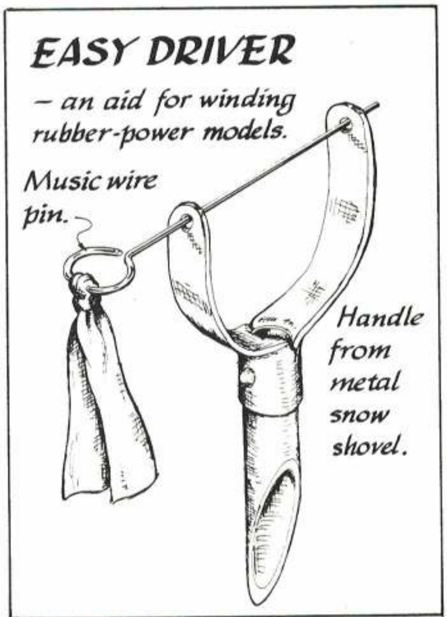
In addition to his many triumphs in Wakefield and Coupe d'Hiver, Bob White has held the Unlimited Rubber record a number of times. His Twin Fin Unlimited, which bears a family resemblance to his Wakefields, received a 1973 Model Of The Year award from the National Free Flight Society.

Red Face Department: The correct address for Crow Hill Models—the outfit that produces the rubber-power gear unit shown in the October 1972 **AAM**—is Box 37, Mill River, Mass. 01244. And while we're at it, readers still ask about the Schwartzbach prop table presented in the October 1970 **AAM**, page 36. The last figure in column E should be 60, not 20. Readers still ask if full-size layouts of the prop are still available. Yes, they are. Send a stamped self-addressed envelop to me, c/o **AAM**.

Bob White—Champion

Stooge: Most rubber-power models use a piece of aluminum tubing to anchor the rear end of the motor. The tube passes through both sides of the fuselage, and the motor loops around it. While the motor is being wound under tension, the motor and model are supported by a piece of heavy music wire that passes through the tube. If you don't have a friend or relative to hold the wire while you wind, you will need some sort of stooge.

The stooge shown in the sketch has been used by Paul McIlrath for several years. He is the fellow that designed the Sig Cabinaire and 29er pseudo-scale kits. Paul's stooge is small and light enough to tuck under your belt when it is not in use, and being made of thin-wall tubing, it shoves into the ground easy. If you don't have an old snow shovel handy, the tubing from vacuum cleaner attachments, pole lamps, or electrical conduit will do. Paint the stooge a bright color, and tie a flag onto the pin. Then it will not be so easily lost.


EASY DRIVER
– an aid for winding rubber-power models.
Music wire pin.
Handle from metal snow shovel.

EAST COAST SOARING SOCIETY

For additional information, a free copy of the ECSS Journal, 'SAILPLANE', and an application blank, forward your request to: Clive Sadler, ECSS Sec., 46 Oakcrest Drive, Dover, DE 19901.

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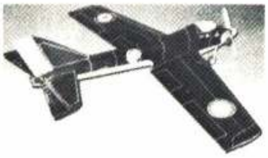

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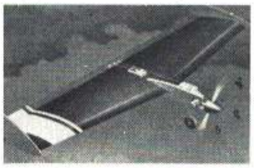

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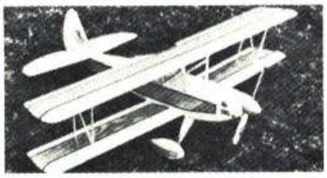

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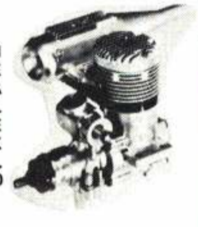

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Wiener Neustadt World Free Flight Championships

Again, the Austrians hosted the Free Flighters from August 15-17. This three-day extravaganza was a whirl of thermals and downers for fliers from thirty-three nations.

by Ron Coleman

Ekhtenkov approaches the takeoff point to make his winning Glider flight.

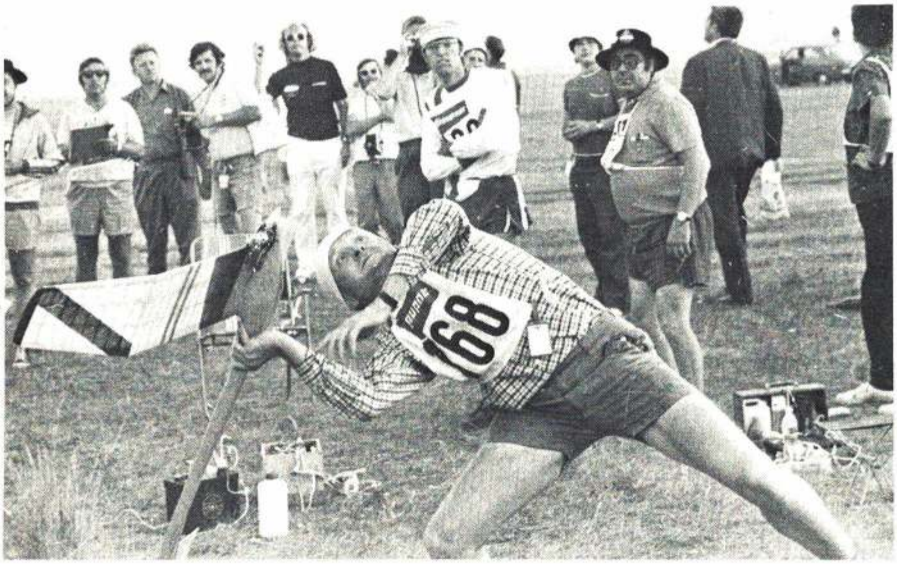
With a calm smile of appreciation at his moment of victory, Joachim Loffler watches his Wakefield being checked over on the weighing scales.

Competitors began to arrive at the Austrian Aero Club's hangar at Wiener Neustadt on Tuesday, August 14. Soon a continuous stream of models began passing by the busy tables and on to the weighing scales.

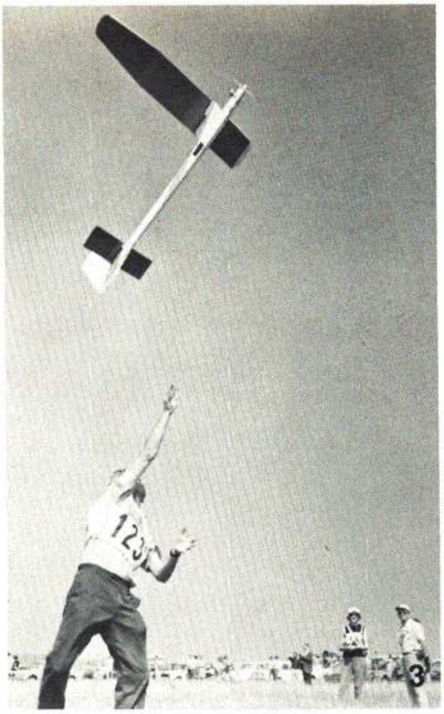
All day long, planes were test flown across the vast grassy airfield in ideal thermal conditions. Competitors who preferred not to take advantage of official town hotel accommodations camped at the edge of the airfield. At sundown, tents and caravan lights scattered about marked the end of flying and the start of aeromodelers' talk in many languages as the night drew on.

Promptly at eight o'clock Wednesday morning, the Wiener Neustadt town band struck up a welcome for the competitors and town dignitaries gathered at the hangar. Dr. Edwin Krill, championship director, delivered an address at the colorful opening ceremony. Suddenly, hundreds of "doves of peace" were released to rise and "max" beautifully in the morning sky. It was a truly festive occasion.

In fact, this day was an Austrian holiday and the town was packed due to a homes' exhibition as well as the modeling championships. Aeromodelers from 33 nations came with almost 1000 model aircraft to fly in the championships. Local people flocked to the airfield to see the Power event, and after the drawn out fly-offs, they were rewarded with a popular Austrian victory by Vaclav Horcicka from "just up the road"—Vienna. Vaclav comes down to fly with the local aeromodelers regularly. It was obvious that he knew the field and its conditions every time he gave that tremendous rocket-like shove to his model, "Big Boy IV."



Horcicka of Austria gets right down to it just before a terrific upward thrust launch in the first fly-off with his winning Power model, "Big Boy IV."



(1) Steen Agner (Denmark) services his "Night Mare 2" which he flew to third place. Note smart tool box (right) which also contains fully automatic starter motor with battery, and meters to show state of battery and glow plug. (2) Verbitsky missed out on the first round and six good maxes were insufficient to bring him to the fly-off. Here, he checks out for the sixth round. (3) Note large-size rudder on model by Dave Sugden of Toronto, Canada. In Power, lots of the altitude is achieved in the launch. An athletic event??? (4) Ron Pollard winds the Wakefield while Ian Kaynes holds on. They are part of the team from England. (5) Steen Agner (far left) assumes a relaxed pose with his Danish glider among a crowd of fliers and timers. (6) Energetic launch by Sunsuke Itoh of Japan puts his conventional design aloft. (7) Steen Agner of Denmark kept on maxing to a third place. (8) Paul Holm Nielsen of the Danish team lets go with a sheeted wing design. (9) Jugoslavian Valda Dusan launches beside his simple thermal detector into the lift, he hopes. His flights brought him to tenth place.

The power scene ran on a very tight schedule and the fly-off began after the sun had fallen behind the mountains. The new arrangement of changing takeoff positions for every round was in use, and the two timekeepers moved along the marked-out takeoff zone together with models and competitors—every round. All the gear had to be hoisted up every time, but some teams set up a separate base area and took along only the necessary bits and pieces. The Bulgarians' tent, which they shared with the Russians, was made from an old parachute.

Sixty-five contestants from 23 nations started the first round in Power; 46 maxed. As one engine after another (mostly Rossis) started up, the decibel level became ear-splitting. Cotton wool wads for the ears would be useful on such occasions!

Hagel, 1971 champion, was still in the second round (as were most), but GB's Ireland dropped out with 98 sec. and so did Ray Monks with 56. Wolff (USA) had missed the first round with 114 sec., Canada's Eggleston with 148 sec. and Verbitsky of the USSR with 167.

The wonderful weather continued all through the day as round followed round. Soon some competitors had bandaged fingers through hand starting. They must have been wishing for the electric starters used by the USA team,

5

(1) Krejcirik of Czechoslovakia waits with the Russian Ekhtenkov (No. 219 in background) in the tense moments before the final flight which determined who would be the World Glider champion. (2) Verbitsky of Russia set for a launch of his A/2 glider. Towing strategy was highly unusual. (3) Martin Dilly of Great Britain proxied Rosalie Douglas' (New Zealand) "Lively Lady." Ship was Elton Drew's winner at 1969 Wiener Neustadt Championship. (4) Denmark's Peter Buchwald launches Karsten Kongstad's Nordic. (5) Frank Parmenter (USA) holds Wakefield steady while his son, Mark, lights and puffs up DT fuse. (6) Mitsuo Kobori, the only team member from Japan, flew his unsophisticated Wakefield model to third place. (7) Jack McGillivray (Canada) winds his Wakefield for a test flight. (8) Member of the North Korean team looks for good air before launching.

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or the neat self-contained tool-box-battery-starter units used by the Danish team.

Thomas Koster's Grootna was one of the contest's most significant entries. This Danish flapped wing design had a very flat glide and a low rate of sink, very easy to see. However, a sticky timer as he came up to the fly-off and a poor transition to the glide helped keep him down to sixth place. Verbitsky of the USSR had a flapped wing model, too, but he did not use it in the contest.

Koster missed out at the second fly-off. Luck of the draw, where each man had to go when ordered, caused him to miss the lift which Frenchman Landeau (of Coupe d'Hiver fame) and Horcicka found. Koster has been a most deserving Power man: he took second place at Save, Sweden, in 1971, and sixth place here back in 1969.

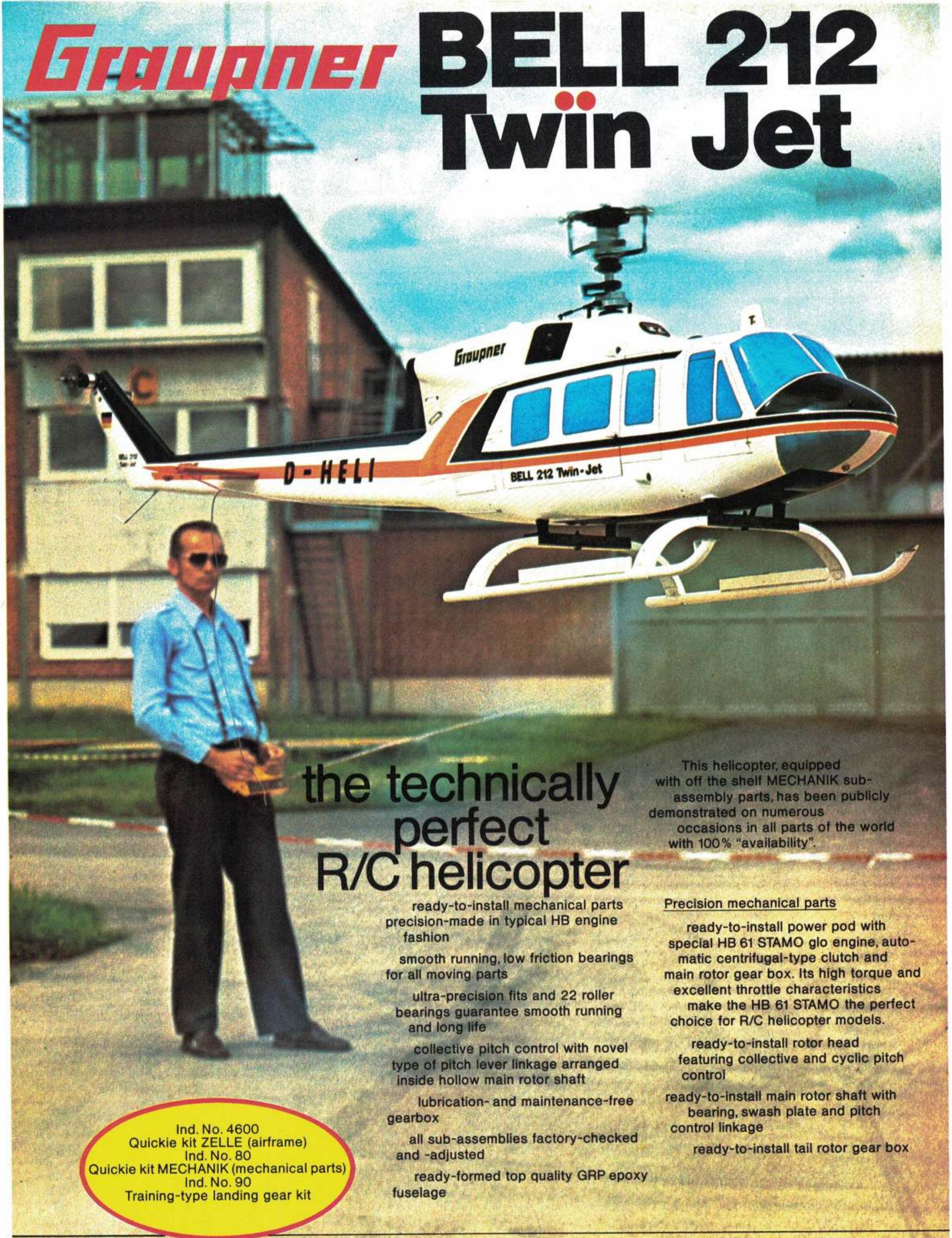
Whoever could have had such hard luck as Tom McLaughlin? Just one second knocked him out in the seventh round after a great day of max flights. This grand old man of American aeromodeling bore the news with a philosophical smile.

When the fly-off began, the motor runs were dropped two sec. each flight. The first flight was eight sec. The second fly-off was six sec. Third and subsequent fly-offs were four sec. There was confusion and some pushing as local Austrian visitors invaded the takeoff area, ignoring repeated requests to move away.

Competing were two Danes, and one representative each from Austria, Bulgaria, DDR, France, Holland, Hungary, Jugoslavia, Korea, Poland and the USSR in the first fly-off. By the time the four-sec. engine runs began, only Agner of Denmark, Landeau and Horcicka re-

(Continued on page 88)

Graupner BELL 212 Twin Jet



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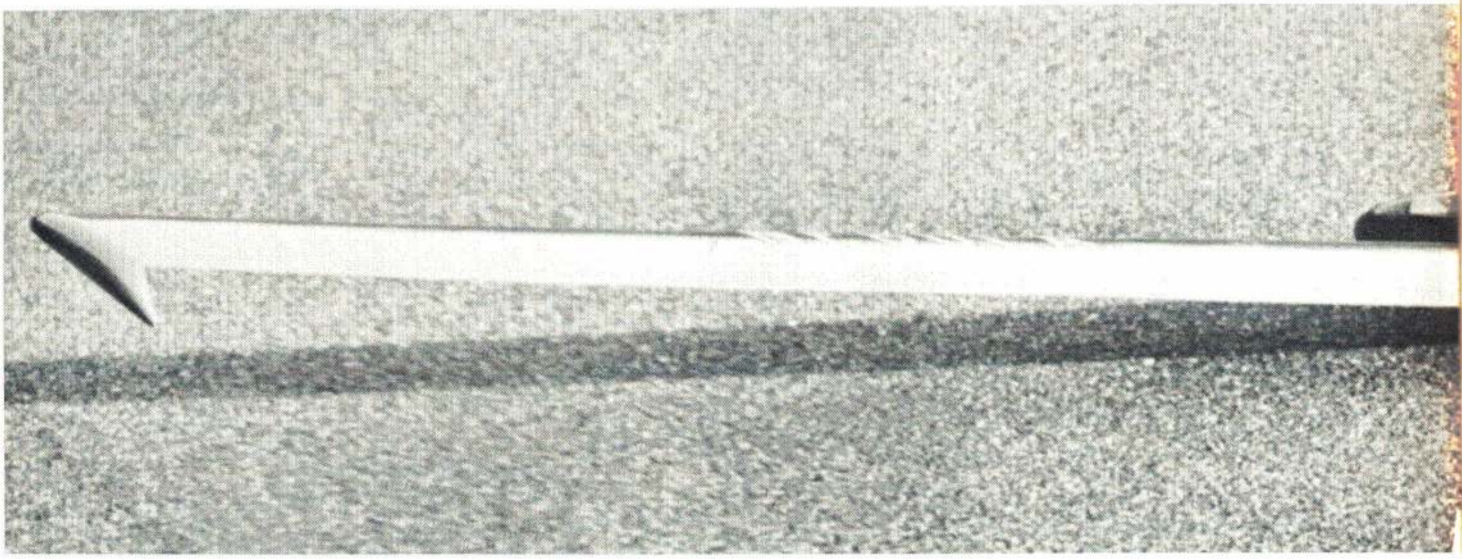
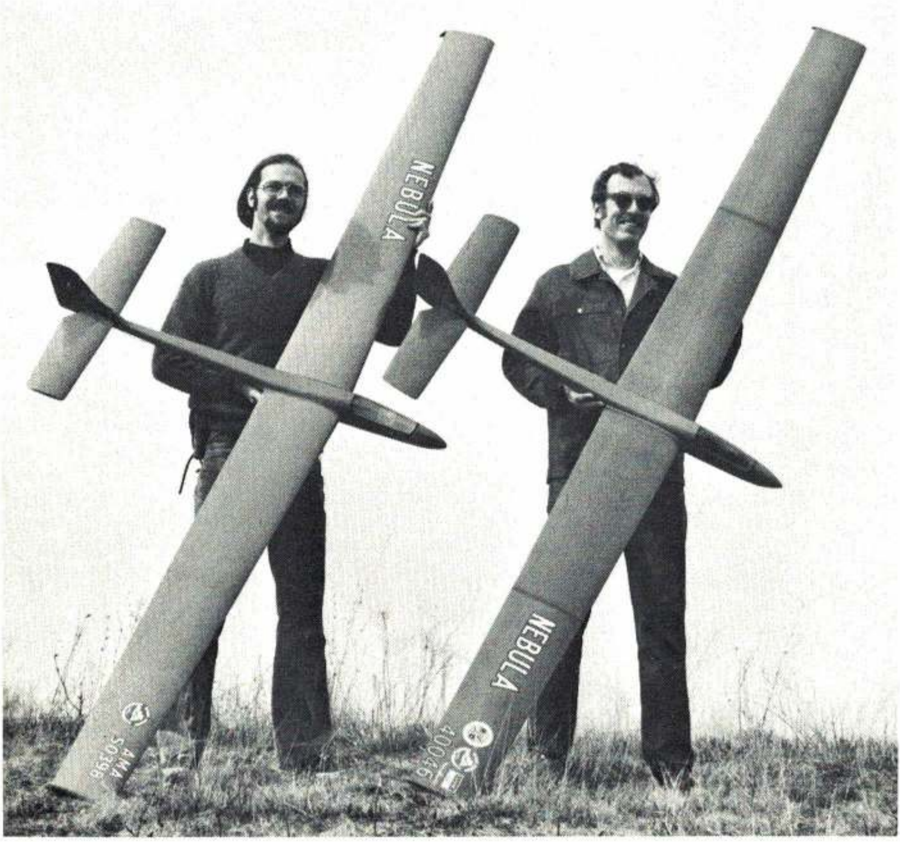


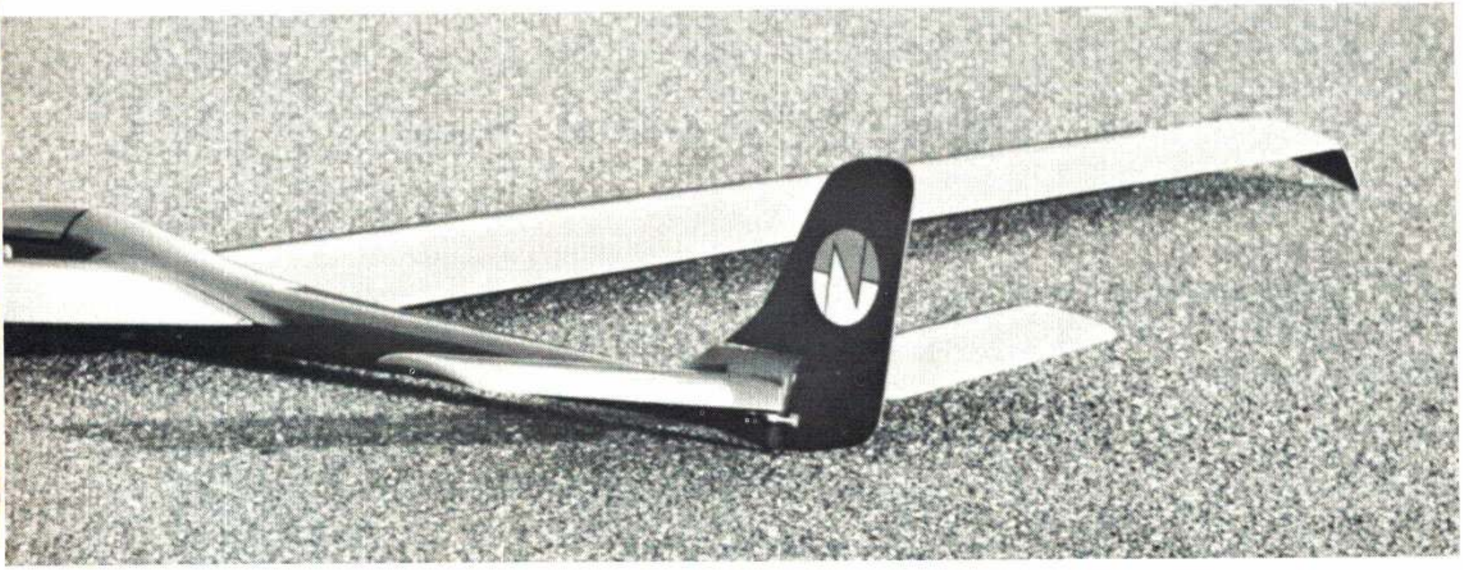


Coauthors with two nice new Nebulas. Dick's bird (right) sports polydihedral; Arni finds that the straight wing version is more his style.

This sailplane is the result of a real team effort by two friends. Many, many hours were spent discussing, arguing, sketching, cutting and building. The labor expended in those hours was amply repaid when the Nebula was launched into its first flight and it looked like we had a winner. When the fifth flight lasted over ten min., from a hi-start launch, we were sure that the total effort had been worthwhile. Here, we explain the design theory behind the Nebula's configuration and construction.

Our most important goal was, of course, good contest performance. Also desired was a realistic, modern appearance and an easy, quick construction method. To achieve good performance, we had to have a conservative, conventional design approach. We're not trying for a radical breakthrough—just a good (hopefully optimum) combination of proven design features. Based on our experience with other designs plus observations at contests, we settled on certain features—the airfoil would be an Eppler 387 with a flat bottom. Every design must be a compromise for weather conditions and other variables, and we felt the airfoil chosen is the best all-around performer for wind penetration and still air floating. To keep floating ability, we want plenty of wing area—the Nebula has 930 sq. in. We are convinced that, for our model sizes, a low aspect ratio is better, so our wing here has an a.r. of 13 to 1—low compared to many current designs.

This contest glider is for thermal flying, but there's also plenty of maneuverability and strength for the slope. It is all-balsa with foam cored wings. Special feature is the optional flaps system. / by Dick Sarpolus and Arni Pederson



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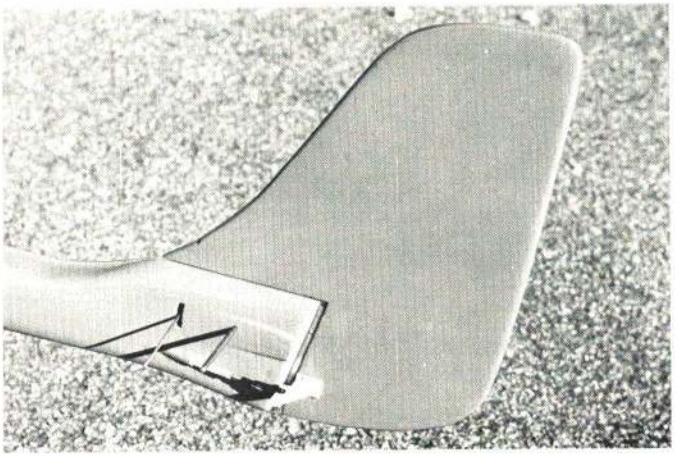
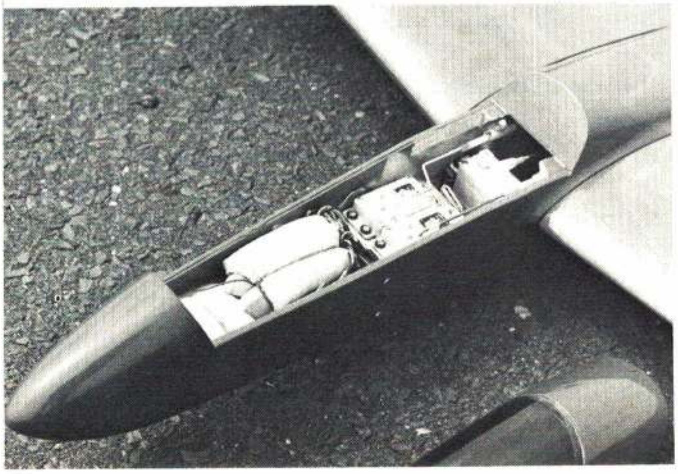
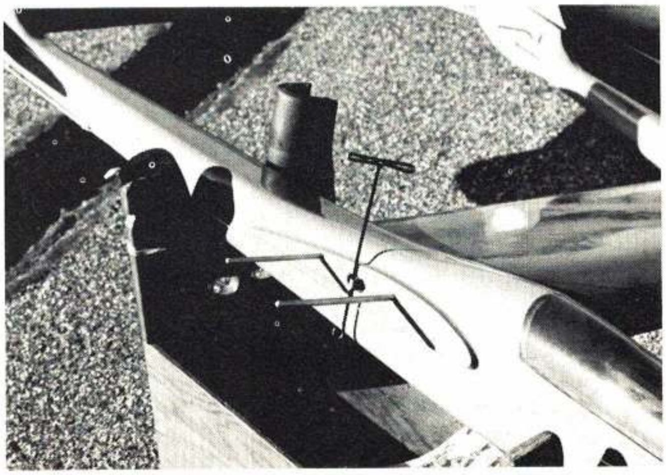


LEFT: Full flying tail surfaces for best control. Note slight fairing for stab seat. Clean lines minimize drag and yield better performance. BOTTOM LEFT: Efficient use of space with plenty of room available. Note that triangular corner stock ends just inside the canopy compartment. Third servo rotates flaps to suit flying conditions. BELOW: Little gadgets make modeling easier. This simple hook device is ideal for grasping those elusive rubber bands while mounting the wings.





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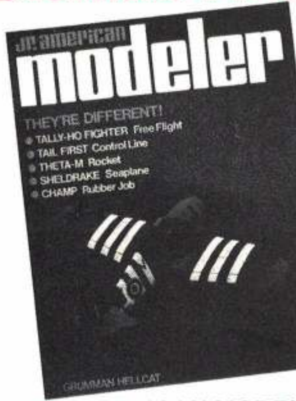

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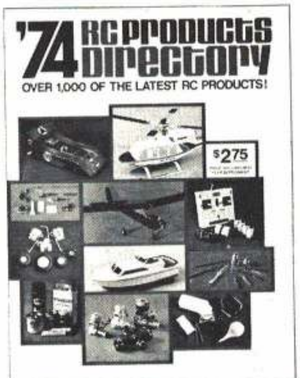
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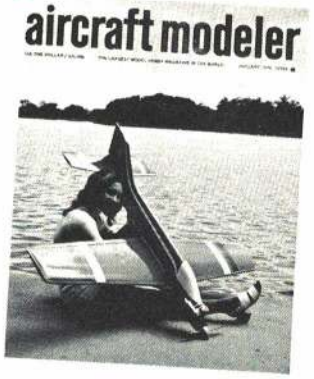

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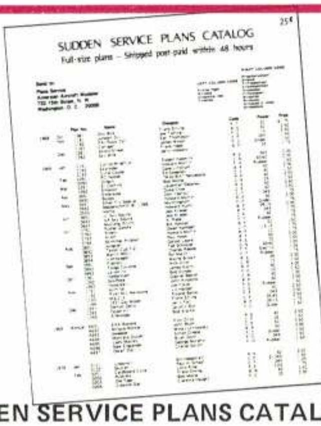

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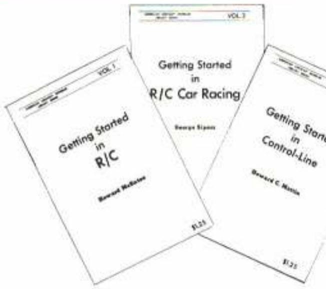

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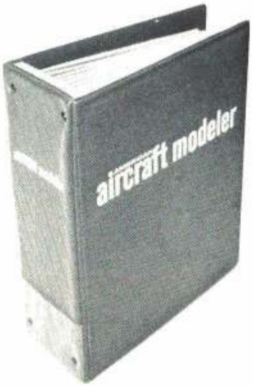

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The stab airfoil is also flat bottomed; that allows a more rearward balance point and lets the stab share the work of flying the model. Full flying stab surfaces are used to reduce the drag of a separate stab/elevator setup. The dihedral in the stab is there only to protect the surfaces when the model lands. The plug-in stab panels also make the model easy to transport. The rudder is sheet balsa for simplicity, large in area to insure adequate control. Shape of the rudder was juggled to get a pleasing, individual appearance.

The tail moment is fairly short simply because a long tail moment is not necessary for performance; the shorter the fuselage, the easier it is to balance the model. The nose moment is long enough for balance and for housing the radio equipment. The shape of the fuselage is a compromise between realistic appearance and ease of construction.

We have built and flown models with straight dihedral and with polyhedral. The straight dihedral definitely looks better as far as realism is concerned. However, we feel polyhedral may be better for model thermal circling performance. Take your choice. The small tip plates may help tip stall characteristics, protect the wing somewhat, and look good.

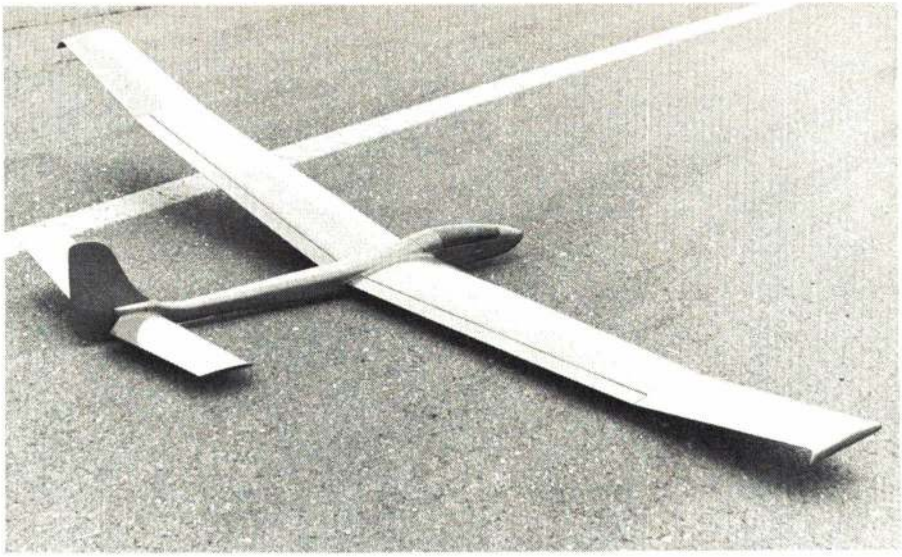
The wings plug into the fuselage for the cleanest, lowest drag configuration. Two 3/16" wire rods are used for the wing attachment, with standard rubber band/screw eyes in the wings to hold them securely.

When we had agreed on the overall configuration, we began to work on construction methods. Starting with the fuselage, we used balsa/plywood in a basic box, with triangle strip stock in the corners to permit a rounded shape. We only needed three blocks: The nose block, of course, and two more top blocks, sized to permit what we feel is a streamlined fuselage. The plastic canopy adds a lot to the appearance; we carved a plug and vacuum-formed the canopy, but flat sheet plastic could be used. Fiberglass fuselages are, of course, nice, but for a quick, easy job, we wanted to stay all-wood.

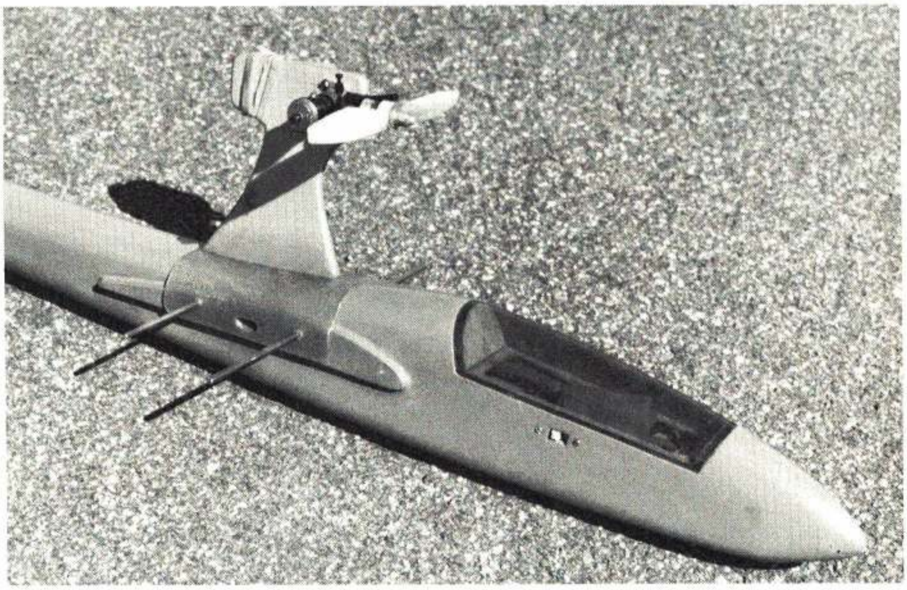
The wing and stab are foam cored. This eliminates cutting ribs, capstrips, multiple spars, planking, etc. (Most areas and RC clubs now have people who can cut foam cores. They are becoming more common all the time.) We feel the weight may be greater, but airfoil shape consistency, strength, and speed of construction make foam cores the way to go. A full depth 1/4" balsa spar is used, with plywood doublers and a sandwich construction used to hold the wing mounting tubes at the roots. Planking is 1/16" balsa—1/32" balsa could be used on the stab if desired.

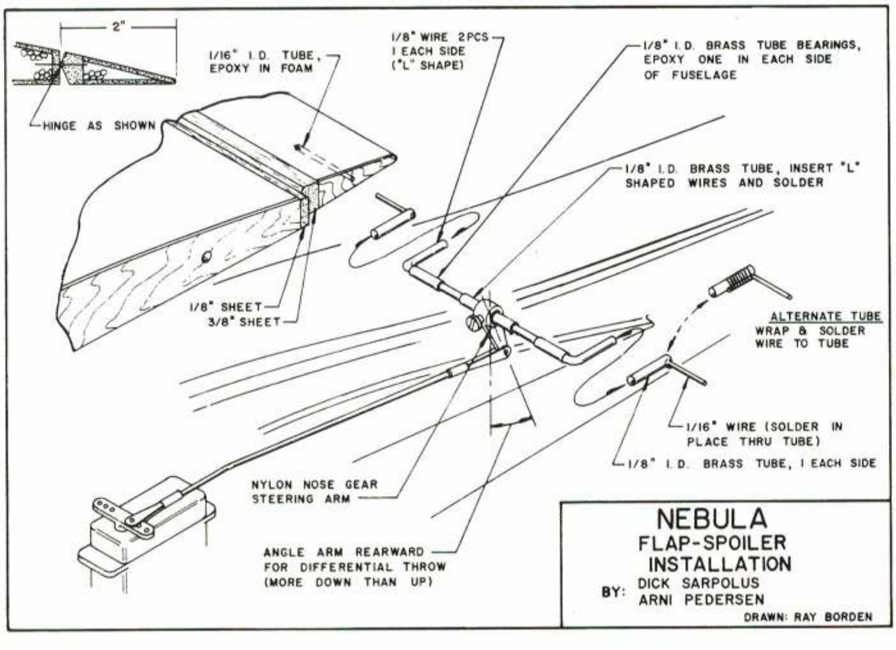
For finishing, we suggest Solarfilm or MonoKote on the wing and stab, and paint on the fuselage. Any type of towhook may be screwed or bolted to the fuselage bottom. We have very successfully flown the Nebula with a Cox 09 on a power pod. The base for the pod was three layers of fiberglass formed

Plan on following page
Text continued on page 74

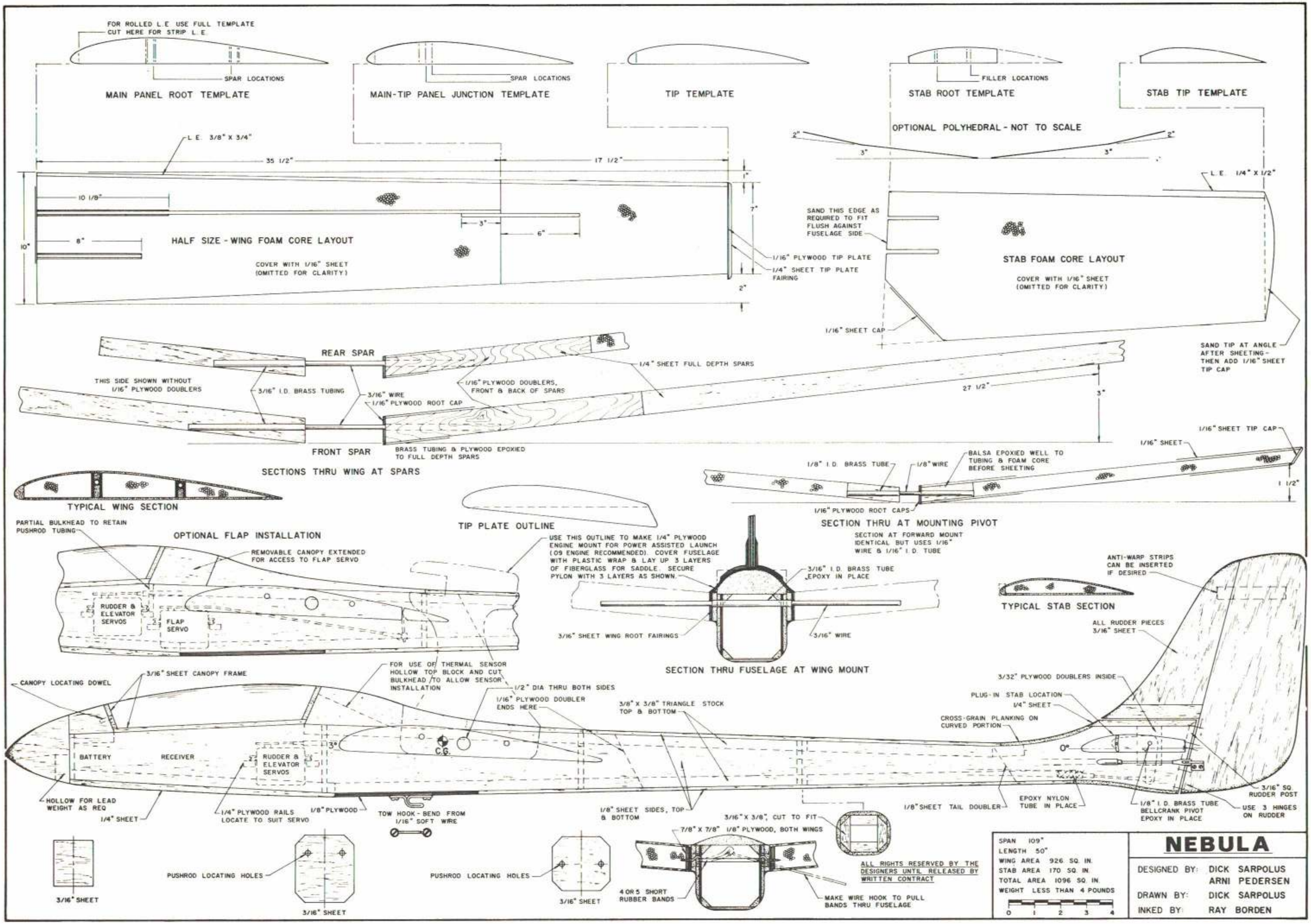


ABOVE: Flaps should have a very close hinge gap and continue the general airfoil contour as smoothly as possible in the neutral position. Dihedral stab gives some ground clearance when the glider rests on a wing tip. BELOW: Text explains how to make this simple power pod system. The Cox 09 really pulls the plane aloft.




2"
1/16" I.D. TUBE, EPOXY IN FOAM
1/8" WIRE 2PCS I EACH SIDE ("L" SHAPE)
1/8" I.D. BRASS TUBE BEARINGS, EPOXY ONE IN EACH SIDE OF FUSELAGE
HINGE AS SHOWN
1/8" I.D. BRASS TUBE, INSERT "L" SHAPED WIRES AND SOLDER
1/8" SHEET
3/8" SHEET
ALTERNATE TUBE
WRAP & SOLDER WIRE TO TUBE
1/16" WIRE (SOLDER IN PLACE THRU TUBE)
1/8" I.D. BRASS TUBE, I EACH SIDE
NYLON NOSE GEAR STEERING ARM
ANGLE ARM REARWARD FOR DIFFERENTIAL THROW (MORE DOWN THAN UP)
NEBULA
FLAP-SPOILER
INSTALLATION
BY: DICK SARPOLUS
ARNI PEDERSEN
DRAWN: RAY BORDEN

FULL-SIZE PLANS AVAILABLE—SEE PAGE 84



FOR ROLLED L.E. USE FULL TEMPLATE
CUT HERE FOR STRIP L.E.
SPAR LOCATIONS
MAIN PANEL ROOT TEMPLATE
SPAR LOCATIONS
MAIN-TIP PANEL JUNCTION TEMPLATE
TIP TEMPLATE
FILLER LOCATIONS
STAB ROOT TEMPLATE
STAB TIP TEMPLATE
OPTIONAL POLYHEDRAL - NOT TO SCALE
2"
3"
3"
2"
L.E. 3/8" X 3/4"
35 1/2"
17 1/2"
10 1/8"
8"
3"
6"
10"
1"
7"
2"
HALF SIZE - WING FOAM CORE LAYOUT
COVER WITH 1/16" SHEET (OMITTED FOR CLARITY)
1/16" PLYWOOD TIP PLATE
1/4" SHEET TIP PLATE FAIRING
SAND THIS EDGE AS REQUIRED TO FIT FLUSH AGAINST FUSELAGE SIDE
L.E. 1/4" X 1/2"
STAB FOAM CORE LAYOUT
COVER WITH 1/16" SHEET (OMITTED FOR CLARITY)
1/16" SHEET CAP
SAND TIP AT ANGLE AFTER SHEETING - THEN ADD 1/16" SHEET TIP CAP
REAR SPAR
1/4" SHEET FULL DEPTH SPARS
THIS SIDE SHOWN WITHOUT 1/16" PLYWOOD DOUBLERS
3/16" I.D. BRASS TUBING
3/16" WIRE
1/16" PLYWOOD ROOT CAP
1/16" PLYWOOD DOUBLERS, FRONT & BACK OF SPARS
27 1/2"
3"
FRONT SPAR
BRASS TUBING & PLYWOOD EPOXIED TO FULL DEPTH SPARS
SECTIONS THRU WING AT SPARS
1/16" SHEET TIP CAP
1/16" SHEET
BALSA EPOXIED WELL TO TUBING & FOAM CORE BEFORE SHEETING
1/8" I.D. BRASS TUBE
1/8" WIRE
1 1/2"
1/16" PLYWOOD ROOT CAPS
SECTION THRU AT MOUNTING PIVOT
SECTION AT FORWARD MOUNT IDENTICAL BUT USES 1/16" WIRE & 1/16" I.D. TUBE
TYPICAL WING SECTION
TIP PLATE OUTLINE
PARTIAL BULKHEAD TO RETAIN PUSHROD TUBING
OPTIONAL FLAP INSTALLATION
REMOVABLE CANOPY EXTENDED FOR ACCESS TO FLAP SERVO
RUDDER & ELEVATOR SERVOS
FLAP SERVO
USE THIS OUTLINE TO MAKE 1/4" PLYWOOD ENGINE MOUNT FOR POWER ASSISTED LAUNCH (.09 ENGINE RECOMMENDED). COVER FUSELAGE WITH PLASTIC WRAP & LAY UP 3 LAYERS OF FIBERGLASS FOR SADDLE. SECURE PYLON WITH 3 LAYERS AS SHOWN.
3/16" I.D. BRASS TUBE EPOXY IN PLACE
3/16" SHEET WING ROOT FAIRINGS
3/16" WIRE
SECTION THRU FUSELAGE AT WING MOUNT
ANTI-WARP STRIPS CAN BE INSERTED IF DESIRED
TYPICAL STAB SECTION
ALL RUDDER PIECES 3/16" SHEET
3/16" SHEET CANOPY FRAME
CANOPY LOCATING DOWEL
FOR USE OF THERMAL SENSOR HOLLOW TOP BLOCK AND CUT BULKHEAD TO ALLOW SENSOR INSTALLATION
1/2" DIA THRU BOTH SIDES
1/16" PLYWOOD DOUBLER ENDS HERE
3/8" X 3/8" TRIANGLE STOCK TOP & BOTTOM
3/32" PLYWOOD DOUBLERS INSIDE
PLUG-IN STAB LOCATION
1/4" SHEET
CROSS-GRAIN PLANKING ON CURVED PORTION
0°
3°
C.G.
BATTERY
RECEIVER
RUDDER & ELEVATOR SERVOS
HOLLOW FOR LEAD WEIGHT AS REQ
1/4" SHEET
1/4" PLYWOOD RAILS LOCATE TO SUIT SERVO
1/8" PLYWOOD
TOW HOOK - BEND FROM 1/16" SOFT WIRE
1/8" SHEET SIDES, TOP & BOTTOM
1/8" SHEET TAIL DOUBLER
EPOXY NYLON TUBE IN PLACE
1/8" I.D. BRASS TUBE BELLCRANK PIVOT EPOXY IN PLACE
3/16" SQ. RUDDER POST
USE 3 HINGES ON RUDDER
3/16" X 3/8", CUT TO FIT
7/8" X 7/8" 1/8" PLYWOOD, BOTH WINGS
ALL RIGHTS RESERVED BY THE DESIGNERS UNTIL RELEASED BY WRITTEN CONTRACT
MAKE WIRE HOOK TO PULL BANDS THRU FUSELAGE
4 OR 5 SHORT RUBBER BANDS
PUSHROD LOCATING HOLES
PUSHROD LOCATING HOLES
3/16" SHEET
3/16" SHEET
3/16" SHEET
SPAN 109"
LENGTH 50"
WING AREA 926 SQ. IN.
STAB AREA 170 SQ. IN.
TOTAL AREA 1096 SQ. IN.
WEIGHT LESS THAN 4 POUNDS
0 1 2 3 4
NEBULA
DESIGNED BY: DICK SARPOLUS
ARNI PEDERSEN
DRAWN BY: DICK SARPOLUS
INKED BY: RAY BORDEN

BUILD MODELS, CRAFTS FASTER CLEANER WITH THE

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GLUE TUBE HOLDER PAT. PENDING

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Try this unique tool on your work table. You'll find that building your craft or model will be so much more enjoyable. The GLUEPIC® ends the messy problems with glue tubes—and at the same time—gives immediate freedom to your hands. This allows much faster and cleaner construction.

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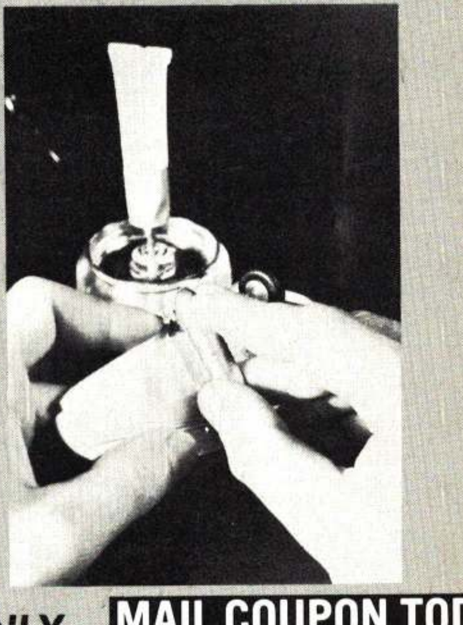

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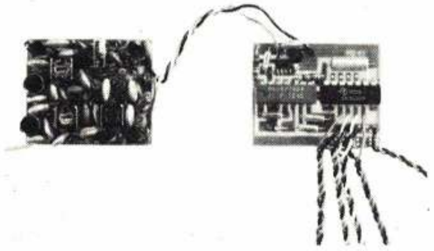
NEW! NEW!

1 TO 8 CHANNEL CAPABILITY!

ACE R/C INC. digital commander

KITS

- Compatible with any modern digital transmitter: 4, 5, 6, 7 or 8 channels. Must be on same RF frequency. Use it as an extra flite pak.
- Available on 26.995, 27.045, 27.095, 27.145, 27.195, 53.100, 53.200, 53.300, 53.400, 53.500.
- Receiver-Decoder in its case measures 1.45 x 1.72 x 1" deep. Weight is 1.4 ounces.
- May be used with positive pulse servos.
- You can begin with 1 or 2 channels if you want to start simple. Adding channels is easy; no conversion required--all you need are a servo and connector for each channel.
- Performance counts! Hundreds of letters from satisfied flyers attest to the fact that the Digital Commander is up there with the best! Kits CAN be assembled with little experience--following directions is a MUST, however!



digital commander (1-8)

RECEIVER-DECODER KIT

Up to 8 Channel Capability!

Here is the Ace Digital Commander (1-8) Channel Receiver-Decoder Combo. This is the ultimate of the 2 channel system developed by Fred Marks, which received a great reception and met with fantastic success in the field.

Voltage regulator has been added to replace original filtering of power supply--this results in outstanding improvement of performance.

With the new decoder you have your option of going with 2, 3, 4, 5, 6, 7 or 8 servos--whatever your transmitter provides.

The Ace Digital Commander Receiver-Decoder Combo will work with any of the present day transmitters available, provided they are on the same RF frequency. It will not work with the Jerobee, ACL Digilog, or Digitrio.

The unit is just as simple and easy and straight forward to wire as the 2 channel. The secret is using IC chips.

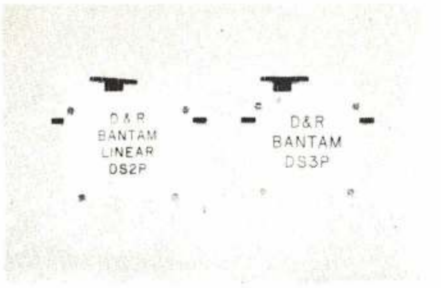
May be used with the Ace Digital Commander servos or any positive pulse servo. Provisions for three or four wire output from the decoder.

Unit in its vacuum formed case measures 1.45 x 1.72 x 1" deep. Weight of the receiver decoder is 1.4 ounces.

Kit includes ABS formed case. No connectors are furnished. Step by step instructions.

No. 12G18	Digital Commander (1-8) Channel Receiver-Decoder Kit	$34.95

- **Available on the following frequencies: 26.995, 27.045, 27.095, 27.145, 27.195 53.100, 53.200, 53.300, 53.400, 53.500**



digital commander SERVO KIT

Housed in the D & R Bantam DS3P mechanics, uses WE 3141 IC for ease in assembly. Kit contains motor, pot, wiper and all components required, with step-by-step manual.

Weight for the DS3P servo is 37 grams: 1.3 ounces. With the DS2P servo, 44 grams: 1.55 oz.

No. 14G20	Digital Commander Servo Kit	$21.95
No. 14G20L	As above, except with D & R DS2P Linear Mechanics (Less connectors)	22.95

digital commander (1-8) FLITE PAK KITS

Offered in Two Versions

We are offering the Digital Commander 8 channel Receiver-Decoder Kit with servos and the new Deans Block Connectors for both convenience and economy.

Available in two versions--8 channel Receiver Decoder with 2 servos; and with 4 servos.

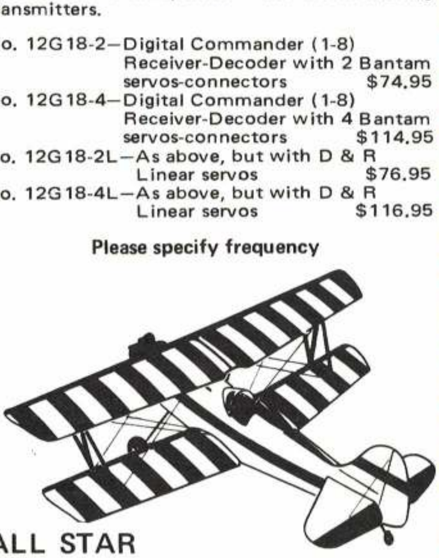
If you want only two channels, our 2 channel Flite Pak (12G30) is your most economical approach. But if you want the capability of going 3, 4, 5 or more channels later, use the Digital Commander 8 combo. No modifications or conversions are needed! The only extras you will need are servos/connectors for as many channels you want to add.

With the Flite Pak Combos you get Deans 3 pin three connector block, with mating 3 pin plugs, battery connector, on-off switch and guard, and hardware. With the 4 servo combo you also get extra 3 pin plug, and a 3 pin connector set for aileron. (Less batteries)

Flite Paks compatible with most existing transmitters.

No. 12G18-2	Digital Commander (1-8) Receiver-Decoder with 2 Bantam servos-connectors	$74.95
No. 12G18-4	Digital Commander (1-8) Receiver-Decoder with 4 Bantam servos-connectors	$114.95
No. 12G18-2L	As above, but with D & R Linear servos	$76.95
No. 12G18-4L	As above, but with D & R Linear servos	$116.95

Please specify frequency

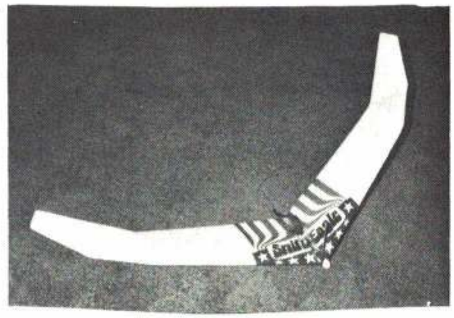


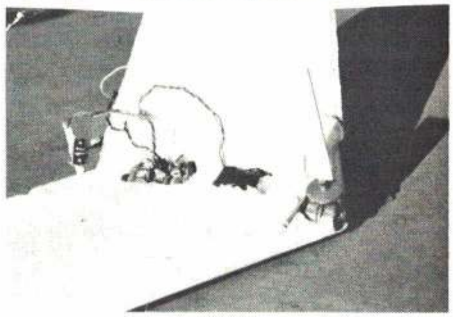
ALL STAR

BIPLANE KIT BY ROMAN BUKOLT

Uses two sets of Ace Foam Wings for ease of building. For use with .09 to .15 power and 2 or 3 channel digital. Do NOT overpower! Beautiful Experimental Aircraft Association type plane.

131200	All Star Deluxe Biplane Kit	$21.95





Dear Friend:

The Pulse Proportional Commanders are finding uses in more ways than we ever dreamed. And more and more of these are going to more and more people, and they are increasingly coming with reports of satisfaction--and a variety of applications.

One such application was received from Ted Off of Ventura, California. He says:

"Eldon has done it again – come out with a new foam glider, 'Swift Eagle'. It is a flying wing that retails for $3.00. The temptation was too great. I bought 4 of them and started to figure out how to put the Commander Pulse Baby system in one. I ended up with the simple system shown in the pictures (got the idea from those magnetic directed gliders they fly in Europe). It flies and turns well. I'm still playing around with exact rudder size, but it doesn't seem to be all that critical.

"The basic construction involves 4 items in addition to the glider and the Commander Pulse Baby system: 1. A piece of plywood, inset into the front of the wing with a 2. blind nut on the back to hold the actuator. 3. A small piece of 1/16 balsa for the rudder (see photo) which is attached to the bent output arm of the actuator with 4. Scotch brand Magic Mending Tape. The Magic Mending Tape is also used to hold the receiver and batteries in position and reinforce the underside of the glider. The Eldon wing is thick enough at the center so it can hold the receiver and batteries without any additional reinforcement. I had to get fancy and glue a piece of foam on the front of the actuator to make things look good.

"I've flown this glider as a slope soarer only, but I can see no reason why it shouldn't tow up on a string or maybe even a high start. The Swift Eagle as designed was intended to be towed or even flown as a kite."

The foregoing is for our readers who are interested in the unique and that something different. The Commander Pulse systems lend themselves to this as well as to just plain fun flying.

If you haven't investigated the greatest thing to hit radio control for fun and relaxation, get a Pulse Commander and a small plane, and let yourself in for some fun.

Yours sincerely,

Paul

Paul F. Runge

OUR 21st YEAR

ACE R/C INC.
HIGGINSVILLE, MO. 64037

R/C EXCLUSIVELY

pulse commander
Price Reduction!

Sales for the Pulse Commander have continued high, and since we are also buying additional components for the Digital Commander, we are getting volume price breaks. We have also become more efficient in our line assembly. As a result we've come up with savings--and we're passing them on directly to you!

The Pulse Commander has the same high quality that thousands of R/C modelers have come to respect, with topnotch excellence of performance. Features the Drain Brain for less receiver-actuator drain; more transmitter power output; four sizes of powerful magnetic actuators to choose from.

Join the thousands who fly the Pulse Commander "Just for Fun"!

THE SIMPLE SYSTEM--

--From 2.5 oz.

--WITH Nicads and Charger

RUDDER-ONLY PULSE IS:

- **LIGHTEST WEIGHT--2.5 oz. for Baby.**
- **LOWEST COST--WITH airborne nicad batteries and charger--begin at $59.95!**
- **SIMPLEST--only one moving part, easily serviced and maintained; noise free.**
- **VERSATILE--Arrange to suit your particular installation. You can go up or down in size without obsoleting receiver or transmitter. Simple changes of battery pack and actuator allow change.**
- **FULLY PROPORTIONAL**
- **INTERCHANGEABLE--Plug-in wiring allows quick switching of receiver from plane to plane.**
- **INEXPENSIVE--Initial cost of system, airplane, and engine is low; one transmitter and receiver can be used for many different styles and sizes of planes.**
- **SIMPLE--Easy installation; actuator has one moving part. Minimum maintenance.**
- **GREAT for Beginners--FUN for Experts.**

TOTAL Flite Pak Weights--

Unit	Weight	Recommended
Baby	2.5 oz.	Pee Wee .020 Up to 48'' gliders
Baby Twin	2.7 oz.	Tee Dee .010-.020 Up to 72'' gliders
Standard	3.7 oz.	.049 to .10
Stomper	4.1 oz.	Tee Dee .049-.23

IMPORTANT: You can save an additional weight on the Standard and Stomper packs by using the Ace 225 ma Stack Pak (38K37) instead of the 500 ma buttons which are supplied. This will come up to weights of 3 ounces for the Standard and 3.4 ounces for the Stomper. This Stack Pak will give you one hour plus flying time between charges. Specify on your order

pulse commander R-O Systems

Completely wired, tested and guaranteed with airborne battery pack and charger, but less transmitter battery.

10G15—Baby System	**$59.95**
10G15T—Baby Twin System	**62.95**
10G16—Standard System	**61.95**
10G17—Stomper System	**64.95**

26.995, 27.045, 27.095, 27.145, 27.195

Please Specify Frequency

SELECTION OF PLANES FOR R-O PULSE

There are many good plane kits on the market for the Pulse Commander. In addition to the Ace Foam Wing Dick's Dream, Ace High and Skampy, there are the House of Balsa Nomad, Micro Models Replica Old Timers--Super Buccaneer, Mercury and Miss America, Sterling's Cirrus and other kits in their line, Dumas Mod Pod, also kits by Goldberg, Midwest, Top Flite and others. Kustom Kits will soon be having their RCM Javalero.

Many builders are designing their own small ships using the Ace Mini Foam Wings.

ACE WHIZARD KIT

An Owen Kampen design means a super something! Features in January 1974 R/C Modeler.

This has to be seen in the air to be believed. Beside the very pleasing lines that it has as a model, its performance is outstanding.

Has been successfully used as a 2 or 3 channel plane with rudder and elevator; or rudder, elevator and motor. Also may be used as a pulse rudder only for single channel.

Recommended for .049 engines. Weight empty is 14-16 ounces. For lighter installations, Cox .049 recommended. For 2 or 3 channels T.D. .049-.051 will be all the power required.

Will perform virtually every maneuver in the book!

Modelers who have test flown this are enthused about it and are using it in addition or in place of their larger ships. Truly designed for the sport flyer, although it is also ideal for the beginner and the novice.

Contains complete sections of the foam wing required to achieve the 40 3/4'' span--240 sq. in. wing and special trailing edge stock.

Kit contains hardware, bent landing gear, and precision band sawed and machine sanded balsa wood and other wood parts.

Top Ace quality.

No. 13L105—Ace Whizard Kit	$17.95

(Available December 1973)

ACE DUAL CHARGER

Here is our Ace Dual Charger which is capable of charging your 450-500 mil receiver and transmitter pack either separately or simultaneously. The two diodes used in our charger are your assurance that you will get the correct charge rate going to your 450-500 mil cells, whichever way they are charged.

Has two pilot lights which indicate charger is operating correctly. Housed in bakelite case, with aluminum front panel. Utilizes heavy duty high quality transformer to isolate it from the 100 volt AC line.

Requires a charge of 12 to 16 hours to restore your batteries to their full peak.

Not furnished with connectors for your battery pack, since there are so many different type of connectors in use.

No. 34K17—Dual Charger Kit	$9.95
No. 34K18—Dual Charger Assembled	$11.95

TRY YOUR DEALER FIRST—if he does not have it, order direct using coupon for fast and courteous service.

Canadian Commander Customers

All Canadian customers for the Commander series of Pulse or Digital Units should contact H & W Enterprises at Box 972, Regina, Sask., Canada S4P 3B2.

R-O PULSE HANDBOOK
WITH
UPDATED CATALOG
Only $1.00
Refundable First Order

Handbook has expanded data on How Pulse Works, Installation, How to Fly -- and much more. Most complete information on Pulse Rudder Only available anywhere.

New catalog is completely updated. Includes many items from major manufacturers.

Price is $1.00 via THIRD CLASS BULK MAIL. If you wish faster delivery, add 50¢ for turn around FIRST CLASS service.

ACE RADIO CONTROL, INC. * BOX 301 * HIGGINSVILLE, MO. 64037

NAME ______________________

ADDRESS ______________________

CITY ______________ STATE ______________ ZIP ________

QUANTITY	STOCK =	NAME OF ITEM	PRICE	TOTAL

Master Charge or
BankAmericard No.

Add $1.00 shipping-handling for direct mailorders except catalog

JOHN SMITH ON CL

There Are Pull Tests And Then There Are Pull Tests: The rule requiring separate pull tests for both jet engines and their mounting brings up a few problems. While we should try to make our sport as safe as possible, sometimes the safety requirements/tests make more problems than are actually solved. The jet engine/engine mount pull test might be one of these problems.

Consider a few situations that may arise: First, a jet engine balances just at the point where the small diameter starts. This puts 50% of the weight in the first seven in. Since many people mount the engine with a front clamp, this means that the front clamp is within two in. of the CG of the engine, and it is carrying a major part of the pull of the engine. The rear clamp is almost a stabilizer for the tube, and while carrying a low load, it is mostly used to locate the tube. Pulling the tube to test mount strength, unless held near the front clamp, will certainly put undue load on the rear mount, much greater than actual flight load.

Now look at another problem. In the past few years, the trend has been toward the side-winder design with the tube carried on the side of the fuselage. Pulling such a mounting shouldn't give too much trouble, but how about the top mount or offset 45° mount type seen now? If the engine is held and the line pulled from the handle end, the old law of shortest distance between two points being a straight line will apply. The inboard wing will want to raise, and if the engine is held tight, whether it's on the CG or not, a twisting force will be put on the wing/fuselage joint. If the inboard wing is held down in some way (a heavy handed helper for instance), a twisting force will still be put on the fuselage/wing joint, the engine and mount giving a levering action that will again put undue load on a normally safe joint.

Wouldn't it be much easier to have a safety cable running to the control unit mounting plate from the engine? I doubt very much if 50% of the models flying today (and they would all be side-winders) will take the engine/mount pull test. Having spent a number of years on contest fields, I've seen more tuned pipes come off than I have jet engines. Let's be safe, but don't make a whole bunch of good, safe (up until this rule, anyway) jet ships obsolete. Comments, anyone?

How About A Proto? Most of the talk at the NATS seemed to be centered around increasing speed without losing control (Class C). This fact coupled with the low turnout of FAI Speed fliers at the U.S. finals in past years (there has never been a full turnout of 30 fliers), makes me wonder why we don't have an event that won't be overly fast and just might generate more interest in FAI Speed? The event I have in mind is A Proto. Before you throw up your hands and holler, "Not another Speed event!", listen closely. The requirements would be same as B Proto for airplane design with the following exceptions: 100 sq. in., wing and stab combined; two-wire, .012" x 52', six in. long, FAI fuel, 75-25 or 80-20; timed from takeoff for 16 laps; pipes allowed, but no single-wire control systems. This should help to get better FAI type engines in competition; many are available now. And if you can get a 16-lap run, why not try FAI Speed with the same engine? If it will run good for 16, it should go pretty well for 10 (FAI course). And it should put some more fun back in Speed. Even the Juniors should be able to handle these.

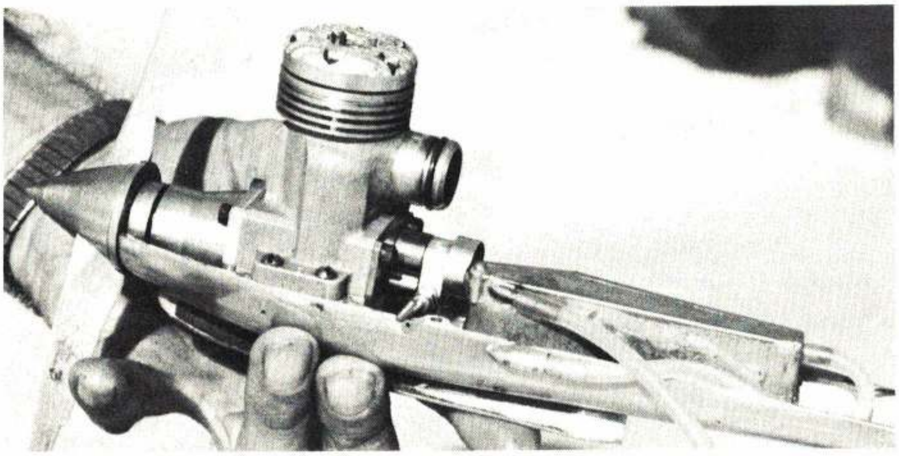
Wonder What Will Happen Now?: With the new rule allowing one and one-half laps to get on the pylon, some fliers will have to find new reasons to put the Big Arm Job on the takeoff of proto models. If CDs enforce the rule as it is written and allow only enough whipping as is needed to get the airplane safely flying, many pilots will have to alter their technique used during that first lap. I've seen launches that, if the engine cut on pit release, would cause the plane to go two laps on will power alone! It would be interesting to see how fast some of the fast jobs really are by using a loop tail skid/stooge release a la early Team Racer style.

I know I'll get letters on this one. Smile modelers, it's still a great sport.

Rule Addition Overruled: Last month I gave some vote results from the CLCB on some related Speed rules additions/changes. Since then, the final vote has been taken and one new rule that was in is now out. That one concerns the builder who was going to be able to either start or fly the model. This rule proposal, endorsed by almost 100% of the Speed fliers who replied to Bill Pardue's original questionnaire, was turned down by the CLCB with no reason given. It is interesting to note that the CLCB members who voted against it are not active Speed fliers and the one CLCB member who is a Speed flier and supplier of Speed equipment did not vote on any of the CL proposals!

Rebuttal: With the above situation in mind, I suggest that we start a National CL Racing Association. This group should be able to regulate their own events, not only at contests, but at the voting booth. Many fliers I questioned at the NATS agree that Speed and Racing participants should regulate their own events, and not have to leave decision making to CLCB members with no interest and even less knowledge of the events we fly. For the present, I will act as a clearing house for those of you who are interested in forming a NCLRA. Send no money, no dues—just your name, address, and Racing events you fly. This organization will be set up to include: CL Speed, Rat Race, FAI Team Race, Goodyear, and Mouse Racers. If you have any sug-

(Continued on page 83)

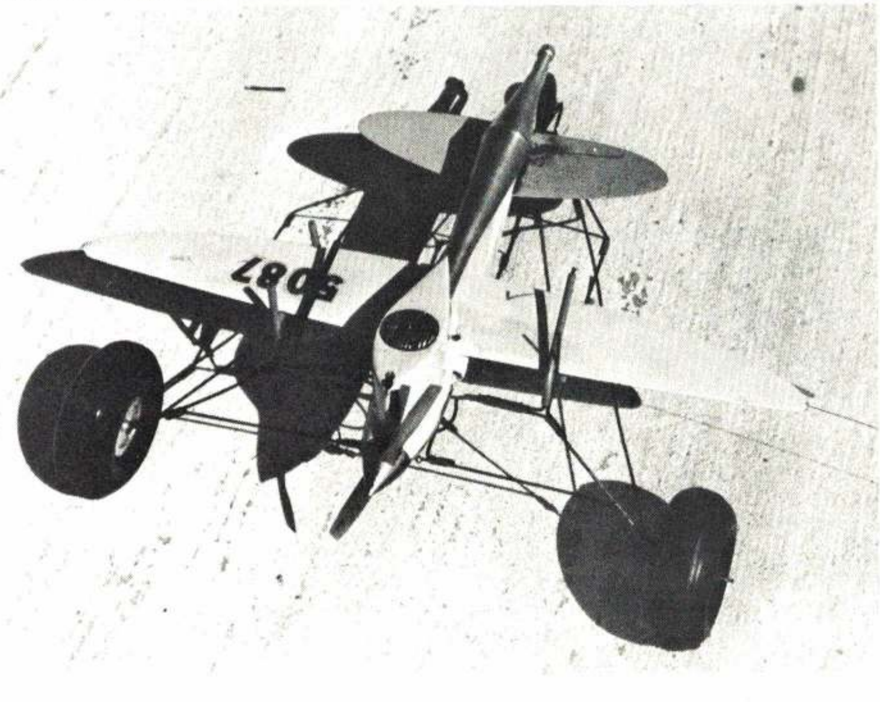


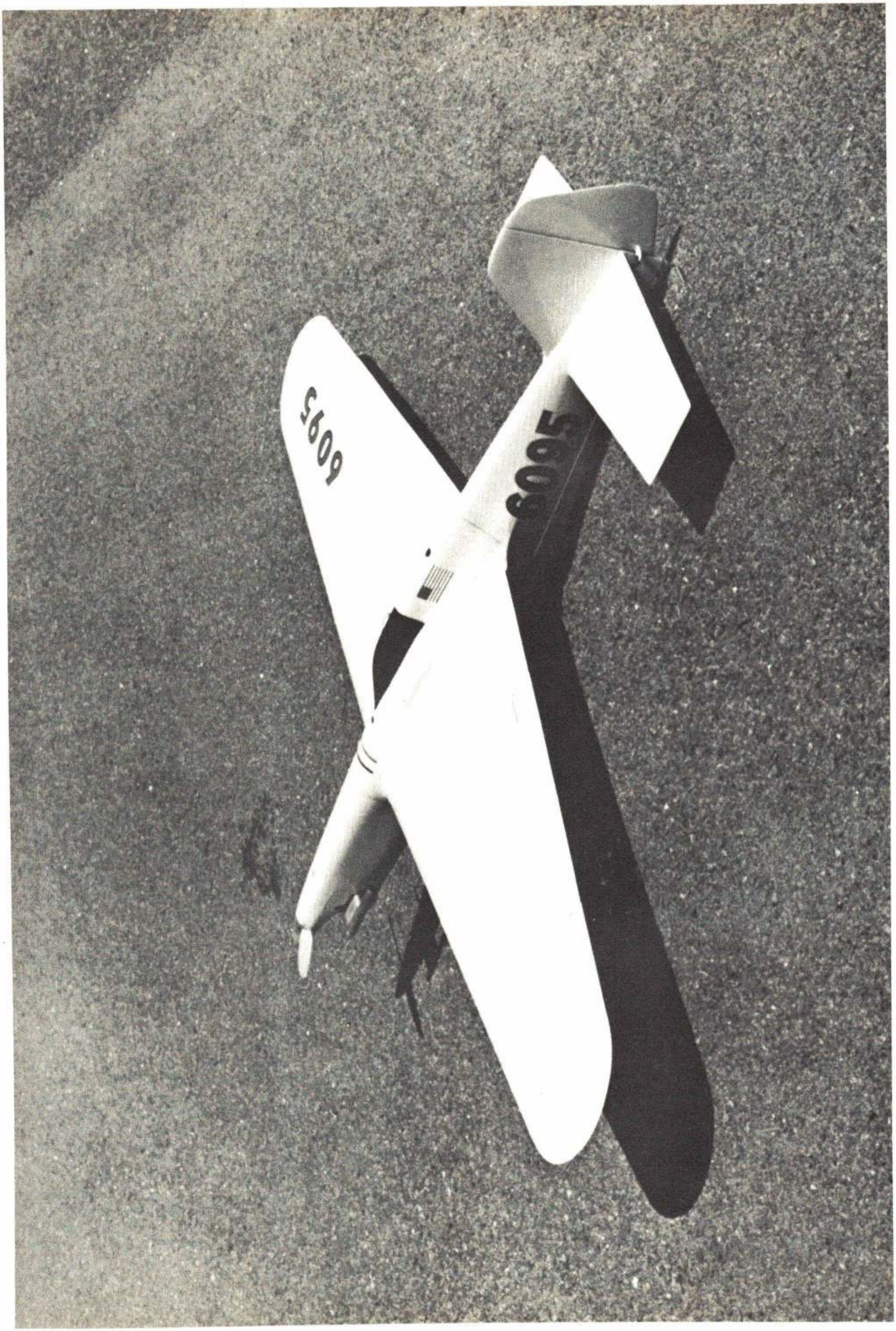
Glen Lee's homebuilt engine. Note O ring for tuned pipe seal.

Don Jehlik "dials-a-prayer."

Glen Lee at the '73 NATS. A dab of this, a dab of that. . . Get ready!

Glen Lee's B Ship at the '73 NATS. Get set!





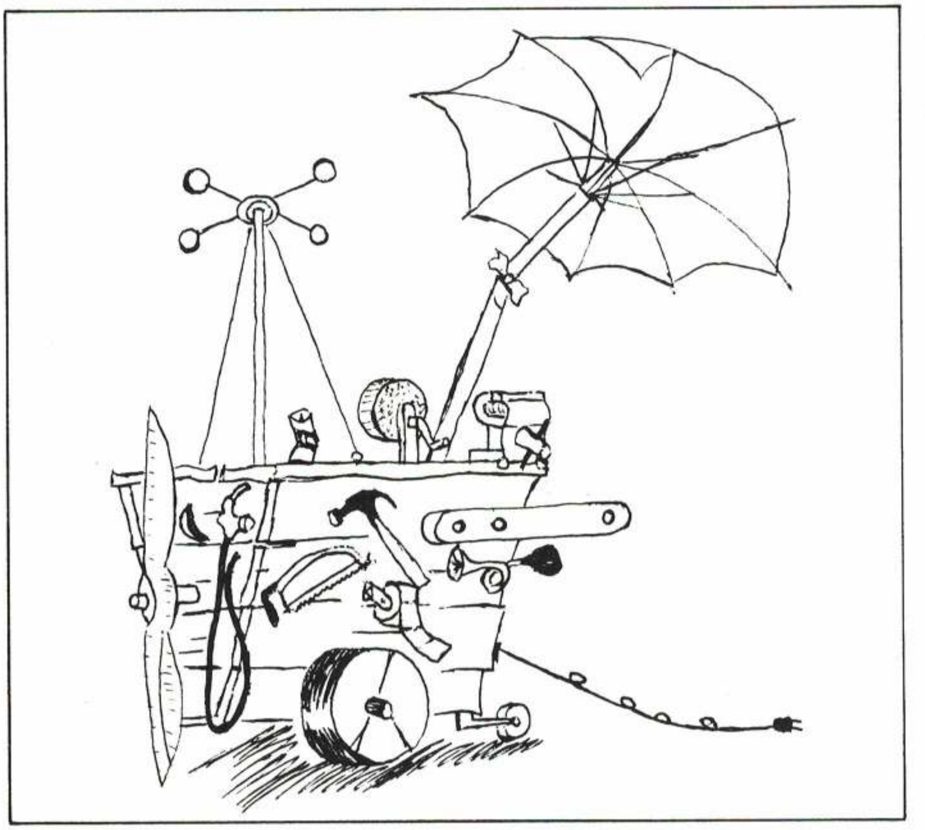
Jim Booker's "Phony Folkerts"

getting started in R/C

SIXTY-SIX IN A SERIES

SUPPORT EQUIPMENT FOR RC FLYING

JIM McNERNEY



In the full-scale aircraft industry, it is called general purpose and peculiar ground support equipment for organizational maintenance. More simply stated in modeling terms, it's all the things you forgot to bring with you to the flying field.

Field equipment may fall into three categories. Some of you might argue about what should go in each category, but if you're just starting, the classifications should give you a feel for where to put your initial outlay. The categories are: (1) items you need, (2) items that are nice to have, but not necessary, and (3) other items available. (We assume you already have a plane and a radio.)

Items You Need: Certain things are absolutely necessary, such as fuel and a glow plug battery. For smaller, lapped piston engines, check with your local hobby shop for recommended fuels. Larger, ringed engines work well with the synthetic oil lubricants.

It is necessary to get the fuel into and out of the airplane tank. You can use a suction bulb for smaller tanks, but a pump, either mechanical or electric, is recommended for large tanks. The glow plug battery should be 1.25 to 1.5 volts. Don't use a lead-acid cell unless there's a diode in the circuit to drop the voltage to 1.5 volts. Special plugs are available to operate at 2.0 volts, but the vast majority are designed for a lower voltage. With throttleable engines, make sure the plug is equipped with an idle bar—a bar across the bottom of the plug to protect the nichrome element from fuel quenching at idle. By the way, carry spare plugs. There are various methods for attaching the battery to the glow plug. Special plugs are available which fit over the glow plug. Special holders are available for a single NiCad cell. A loop hangs over the top of the plug and the battery terminal rests on the cylinder head. Since the plug draws rather high current, the cell must be a high rate one.

Nice To Have Items: If you're using wooden props, and I recommend them for any engine larger than a 35, you'd better have some spares and the appropriate prop nut wrench. By the way, nylon props break, too.

Assorted screwdrivers, socket wrenches, pliers, a tapered reamer for undersized props, some fine wire for cleaning needle valves, a plug wrench, a set of Allen wrenches, an X-acto knife, straight pins and a "chicken stick" also fall into this category.

For field repairs, it's a good idea to carry some quick curing epoxy, a spatula and plastic jar lid for mixing. Clean rags or paper towels are also useful. By now, you realize that something in which to carry all this stuff is handy. We've seen a variety of toters including cardboard cartons, fruit baskets, tackle boxes and both homebuilt and ready-made custom field boxes.

Other Items: Included in this category are such things as electric starters and batteries, 12 volt soldering irons, 12 volt radio battery chargers, power panels with current and voltage monitor, stands for transmitter and aircraft, spare engine and servo parts, assorted hardware, construction material and covering material, files, tachometer, servo tester, chair, umbrella, poncho, canopy, bug repellent and first aid kit.

The modeler is supporting a thriving business. You can drop up to $1000 on accessories and goodies. Choose wisely. Start with the bare essentials. When you perceive a need for something, shop around for it. Buy neither the cheapest nor the most expensive. Look at what the other fellows are using. Ask them about their experiences with the item and ask if you can try it out. However, don't try to get by like that forever. Sooner or later, you'll have to quit borrowing from the other guys and buy your own.

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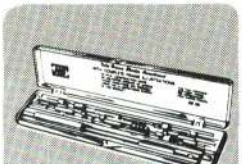

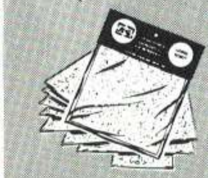

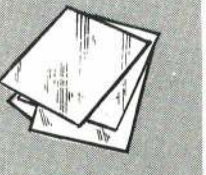

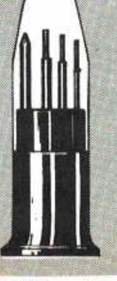

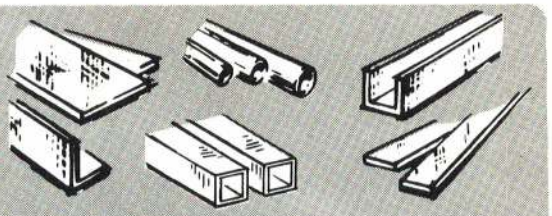

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130	7/32	.35
131	1/4	.40
132	9/32	.45
133	5/16	.50
134	11/32	.55
135	3/8	.60
136	13/32	.65
137	7/16	.70
138	15/32	.75
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140	17/32	.85
141	9/16	.90
142	19/32	1.00
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232	.016 x 1	.35
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234	.016 x 2	.65
235	.025 x 1/4	.20
236	.025 x 1/2	.30
237	.025 x 1	.55
238	.025 x 3/4	.50
239	.025 x 2	1.00
240	.032 x 1/4	.20
241	.032 x 1/2	.35
242	.032 x 1	.65
243	.032 x 3/4	.50
244	.032 x 2	1.20
245	.064 x 1/4	.38
246	.064 x 1/2	.75
247	.064 x 3/4	1.00
248	.064 x 1	1.50

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STOCK NO.	SIZE	PRICE EACH
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150	3/32	.40
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154	7/32	.65
155	1/4	.70

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256	.032 Alu.	.65
257	.064 Alu.	.90
258	Asst. Brass	.75
259	.025 Copper	1.85

BRASS ANGLE (12")

STOCK NO.	SIZE	PRICE EACH
171	1/8 x 1/8	.30
172	5/32 x 5/32	.35
173	3/16 x 3/16	.45

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STOCK NO.	SIZE	PRICE EACH
181	1/8	.40
182	5/32	.45
183	3/16	.55

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STOCK NO.	SIZE	PRICE EACH
160	1/32	.06
161	3/64	.10
162	1/16	.10
163	3/32	.20
164	1/8	.30

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197	.055	.05
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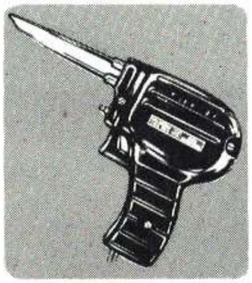

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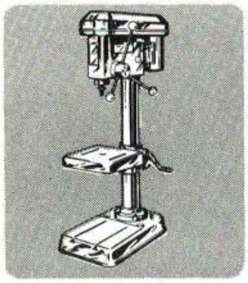

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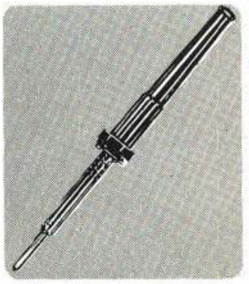

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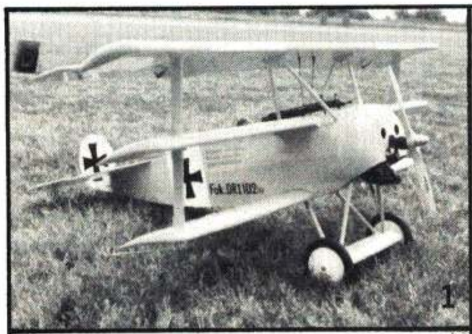
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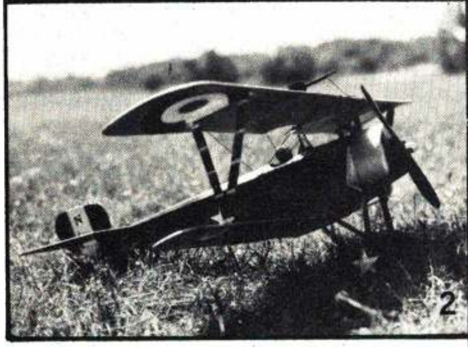
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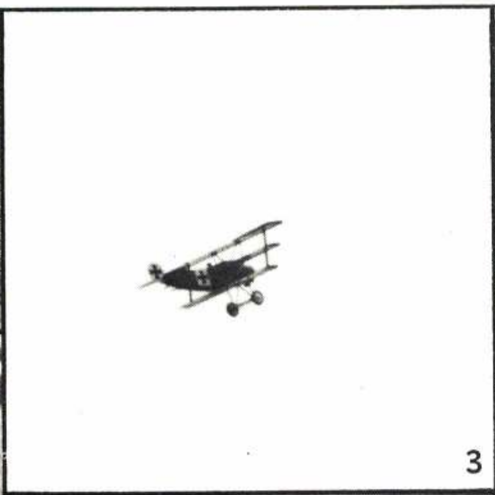
(1) Exposed engine, visible carburetor, protruding crankshaft would all make a Scale nut turn grey. This is Sport Scale though, where easy engine access and low maintenance flying are just as important as fidelity. Bill Slater put it all together for top Scale honors. (2) Jedelsky wing structure and Mills diesel power highlight winning Free Flight Scale entry by Vic Larson. All-sheet structure is good trade-off of durability and looks. (3) Bill Slater's winning Fokker tripe illustrates the excellent handling characteristics of an ever popular Scale subject. (4) Curt Sanford's beautiful F51-C glistened its way to second place in CL Scale. One in.-one ft. model is three years old; it sports a Fox 35. (5) What is more nostalgic than a J-3? This Max 60-powered version brought home a second place trophy in Sport Scale for Bill Gattis. Straightforward models such as this are appropriate for both competition and weekend fun flying. (6 & 7) Larry Jennson with everything (almost) under control. Touch and Go became wheelbarrowing touch and blow. (8) Hopes of repeating his recent win at the Cliff Cloud Climbers Annual sunk when Duke Horn's Solar "C" ship hit down air in the final fly-offs. ST 40-powered. (9) Daughter Lisa coaches her Dad, Eddie Thomas. "I think you left the engine for that model on the workbench at home, Daddy." (10) "Come on, baby, light my fire!" Cigarette lit. . .(check), glow plug lit. . .(check), D-T fuse lit. . .?? Eddie Thomas' original "B" Tomboy blazes its MonoKoted wing toward a max. (11) Chopper demos are quickly becoming the "in" thing at contests. Terry Rollins thrills spectators with his Cobra. (12) "Isn't it cute?" asks Curt Sanford about his 020-powered Cub. He held his own in both Free Flight and CL Scale. (13) Bill Boyd pits son Johnny's Goodyear. Goodyear, an ever popular event, is finding more family participation. Father and son teams are natural, since practice sessions stay within the household. (14) Lee Liddle cut enough streamers to take the trophy for first place in Sr. Combat with a model featuring high aspect ratio tail.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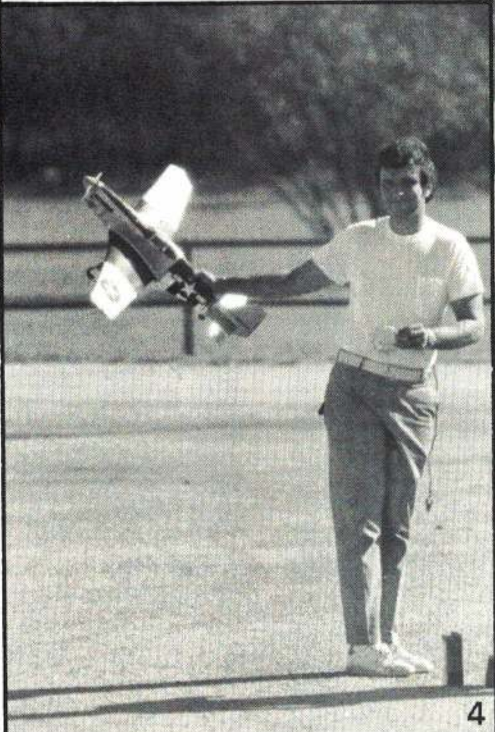
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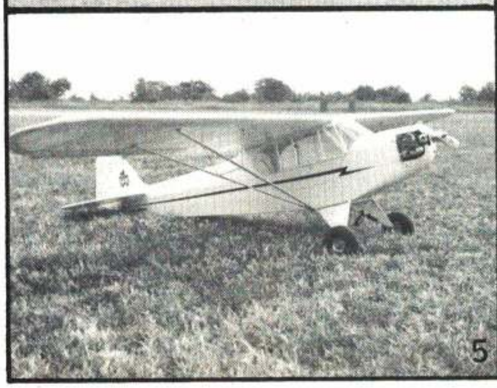
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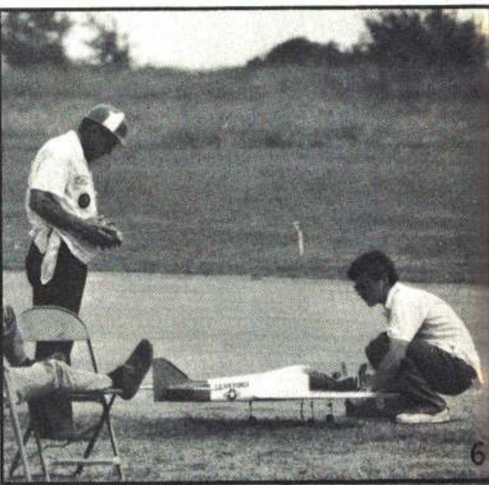
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John E. Clemens Style

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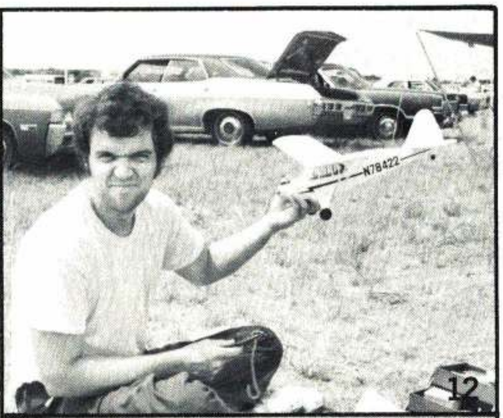

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The Southwest Model Airplane Championships originated with John E. Clemens' local Sunday flying sessions in Texas 36 years ago. / by Jerry D. Farr

Labor Day weekend in Dallas, Texas, is a tradition in AMA District VIII, and the Southwest Model Airplane Championships built the tradition over the past 36 years.

This contest had its inception on Labor Day in 1938, headed by a young Dallas hobby shop owner, John E. Clemens.

In the early days of this contest, Johnny had small, relaxed groups of modelers for a Sunday flying session with some modest prizes. (After the War), as the word got around, some of the local fliers were called upon to help Johnny run the meet.

As the contest grew to a two-day affair, Johnny called for help, and some of the finest names in the Southwest came to his aid: Maurice Teater, Bill and Betty Bell, Ed Alexander, Bob Luthker. In later years, Ed Rankin, Murry Frank, Dick Atkins, Johnny Casburn and, of course, Bud Tenny joined in. When the Exchange Club began sponsoring the Southwests, it quickly mushroomed from a one-site combination contest into a miniature NATS.

The 1973 contest was the first one Johnny missed in all those years. As most of you know, AMA President Johnny Clemens was in the hospital awaiting surgery, and is now on the road to recovery. There were three 12 x 24" cards with over 300 AMA and Exchange Club members signatures delivered to him at the hospital after the contest.

For the past 15 years, the Exchange Clubs of Dallas have set up and sponsored the contest with a minimum of problems. The members of the Exchange Clubs sell advertising in the contest program which has now become a large magazine with hundreds of ads from Dallas merchants.

This contest is now flown on three separate sites. Control line is at Hobby Park on the northwest side of Dallas, a well-planned five-circle flying park. RC is flown at the Dallas RC Club site at Samuels East Park, 14 miles away. Free flight is also at Samuels Park, but half a mile east of the RC site.

Some of the contestants entered both FF and CL events and found themselves making a "white knuckles on the wheel" drive in crosstown traffic in

(Continued on page 90)

BILL BOSS ON CL

Attention All CL Modelers: Just got word that the Scale Contest Board has voted in a set of Sport Scale rules effective 1974. The new rules are based on Mike Stott's (Montezuma, Iowa) proposal SC-73-10 that appeared in the Mid-May 1973 AMA Competition Newsletter. The general purpose of the new event is to introduce more modelers to Scale modeling activity at a level of work not much more demanding than building and finishing one of the many Sport Scale kits on today's modeling market. The ultimate goal, of course, is to provide a stepping stone to the full Flying Scale event. For those of you that do not receive AMA's Competition Newsletter, and who might be interested in trying your hand at the new event, the following is a summary of the new rules.

Safety, power (engine size), line sizes, weight and pull test requirements are taken from the CL Flying Scale event Section 35, Items 1-5 of the AMA Rulebook.

Proof of scale, static judging and scoring, bonus points and flight (number and length of flight) are taken from the RC Sport Scale event Section 34, Items 6-10.2 of the AMA Rulebook.

The Flight Plan consists of ten optional maneuvers and/or scale operations, four of which shall be obligatory and the remaining six the choice of the contestant. The four mandatory options are: Takeoff, ten airborne laps, landing and flight realism. The contestant's six choices may be selected from those listed in the AMA Rulebook under AMA or FAI CL Aerobatics or Scale rules. If a maneuver or scale operation is not listed, but was actually performed by the plane modeled, e.g., crop dusting, it may be used by the entrant as an option.

Scoring of the event will be accomplished equally between static judging and flying with each section worth a maximum of 100 points. In addition, a bonus of ten points can be earned if the modeler proves he has designed and built the plane by presentation of construction drawings.

Static scoring will be organized into the following three categories: Accuracy of Outline, max of 30 points; craftsmanship, max of 30 points; finish, color and markings, max of 40 points.

Flight scoring is to be based on a maximum of 100 points—a ten-point maximum for each of the ten-options allowed.

As mentioned previously four of the ten options are mandatory—takeoff, ten airborne laps, flight realism and landing; all of these are self-explanatory except, perhaps, the ten airborne laps. It is not necessary to complete a set number of flight laps to qualify in the event as is the case in CL Flying Scale; instead, one point is awarded for each flight lap

(Continued on page 80)

"Thorpe 18," an Experimental Aircraft by Ralph Burnstine, Danville, Ill., won the EAA Homebuilt Scale Special Award in CL at the '73 NATS. The Thorpe featured throttle control, sliding canopy, finely detailed instrument panel and cockpit, and electrically driven flaps.

Spitfire by Frank Marino, Brooklyn, N.Y., made from a Sterling kit featuring flaps, bomb drop and throttle control is an excellent subject for the new Sport Scale event.

CLAUDE McCULLOUGH ON RC

Color Book: *The Chicago Scalemasters Color Guide—Military Aviation Colors, WWII to Present* has been published in a limited edition by this all-scale group as a club project. After careful research, the Scalemasters patiently hand assembled the book by gluing 159 paint chips in place. Many of the chips came from the Federal Standard 595 Color Guide; others were special colors mixed and matched by the Scalemasters. There are sections covering all the participants in WWII plus current finishes used by U.S. warplanes. Suggestions on paint mixing and matching are included.

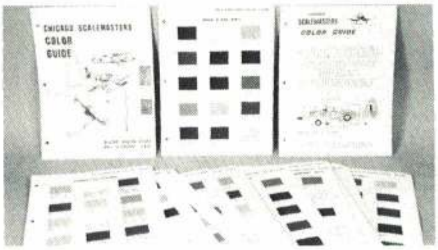
This is a great source for judging presentation material and a must for all scale enthusiasts who want to paint their models correctly. On heavy paper and in loose-leaf format, the guide may be obtained for $10 postpaid from Keith Ward, 636 Swain, Elmhurst, Ill. 60126. They plan to issue supplemental sections in the future and a WWI color study is presently underway.

Homemade III: Another method of do-it-yourself decaling comes from Tom Stark, 1973 Scale Category Champion. For solid color decal uses, he sprays clear dope on ordinary gummed package sealing tape, then several coats of color dope. Cut out the required decoration from the tape and soak in water to remove. It takes longer to soak off than a standard decal, but sticks on the model better. Since it is made of dope, clear dope can be sprayed over it without wrinkling; this makes the decal a permanent part of the model's finish.

Kovering Kink II: After reading my October column about how to keep longeron/upright fuselage joints from spoiling the appearance of a covering job, Chris Moes suggested a method of preventing wrinkles and unsightly irregular dope puddle spots near trailing edges, wing tips and tail outlines. Brush some melted paraffin and place near the edge where the covering is not supposed to stick. The warm wax flows on thin and hardens when it cools forming a film to which the covering won't adhere while being applied or doped. Appearance is greatly improved, especially where a metal interior structure has been duplicated. This would also work for the tops of internal spars and gussets near the fabric surface where the tendency is for the covering material to sag between the ribs while wet.

Wonder Where The Yellow Went: Mike Stott puts a few drops of blue dope into batches of white before using on a model to help prevent the tendency of that color to yellow with age.

Non-Scale Holes: Don't think your grip on the drill will prevent you from going farther than intended when drilling holes into a model. When a bit comes through the back side of a landing gear mounting block, the resulting jerk can carry it right out the other side of the wing. Mark the required depth and put a tight fitting grommet or ridge of tape on the bit as a positive stop.



Chicago Scalemasters' Color Guide

Tom Stark flies RC Scale, too, but this is his '73 NATS winning Monocoupe rubber-powered model. Lettering is commercial dry-transfers, while solid color markings are decal material. Clear dope over all, but spray dope lightly over transfers to avoid blistering.

WALT MOONEY ON FF

The San Diego Orbiteers Scale Contest: Imagine almost a dozen WWI fighters whirling about each other in the blue. At the last San Diego Orbiteers Scale Contest, that was the grand finale. WWI Peanut Scale was the challenge; there were 11 entrants with WWI Peanut fighters entered. A few psuedo-fighters were also allowed to fly, but they didn't do too well in the Scale judging.

Scale judging in the Mooney tradition took place after the flying. For the flight judging, Duration was the name of the game, but with a difference. Each pilot had to challenge each of the other pilots to a duel. Models were launched simultaneously and the last one in the air won the duel. After every pilot had flown against every other, the one with the most wins in these duels was the winner.

It turned out to be a fun contest; no timers were necessary, yet every entrant made at least ten official flights.

Another event was one in which the object was to shoot down an observation balloon. Each entrant was given two pins to tape to the wings of his model and allowed unlimited attempts to hit and down a tethered balloon floating eight or ten feet above. This turned out to be quite a difficult task, but was finally won by Doug Fronius after many tries and misses by several of the entrants. Doug actually hit the target twice. The first time, he left one of the pins imbedded in the balloon which refused to pop.

Models flown included Fokkers, D VIs, and Tripe; Albatros's, DVs, DH6s, Bristol Scouts; a Dornier Cantilever Bipe, Albatros D XI, Microplane Veloz, and (best in Scale) Bill Hannan's Nieuport in Italian colors with the lower wing surfaces in red, silver and green.

Rich Castle ran the events and the record sheet and then awarded the balsa crosses for Jasta '73.

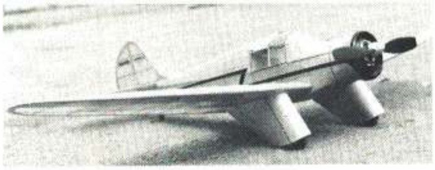
Your correspondent was awarded a Balsa Cross First Class for winning eight combats Ernie Wrisley won seven.

Annual Flightmasters Scale Meet: Once more the Rockwell International Flightmasters have outdone themselves. This year at the annual Scale meet they had at least 104 entries in Gas, CO-2, Rubber, Peanut, and Electric events.

The judging room was spectacular. It was opened early this year because Rockwell was having a hobby show. Spectators passed a real collection of classic automobiles on their way into the Flightmasters' judging site. In and around the displays, some of the entrants were finishing their models. Bill Watson was demonstrating his helium-filled blimp, and his butterfly-sized ornithopter. Others were fly-

(Continued on page 82)

Buckner's Electric Aeronca low wing.

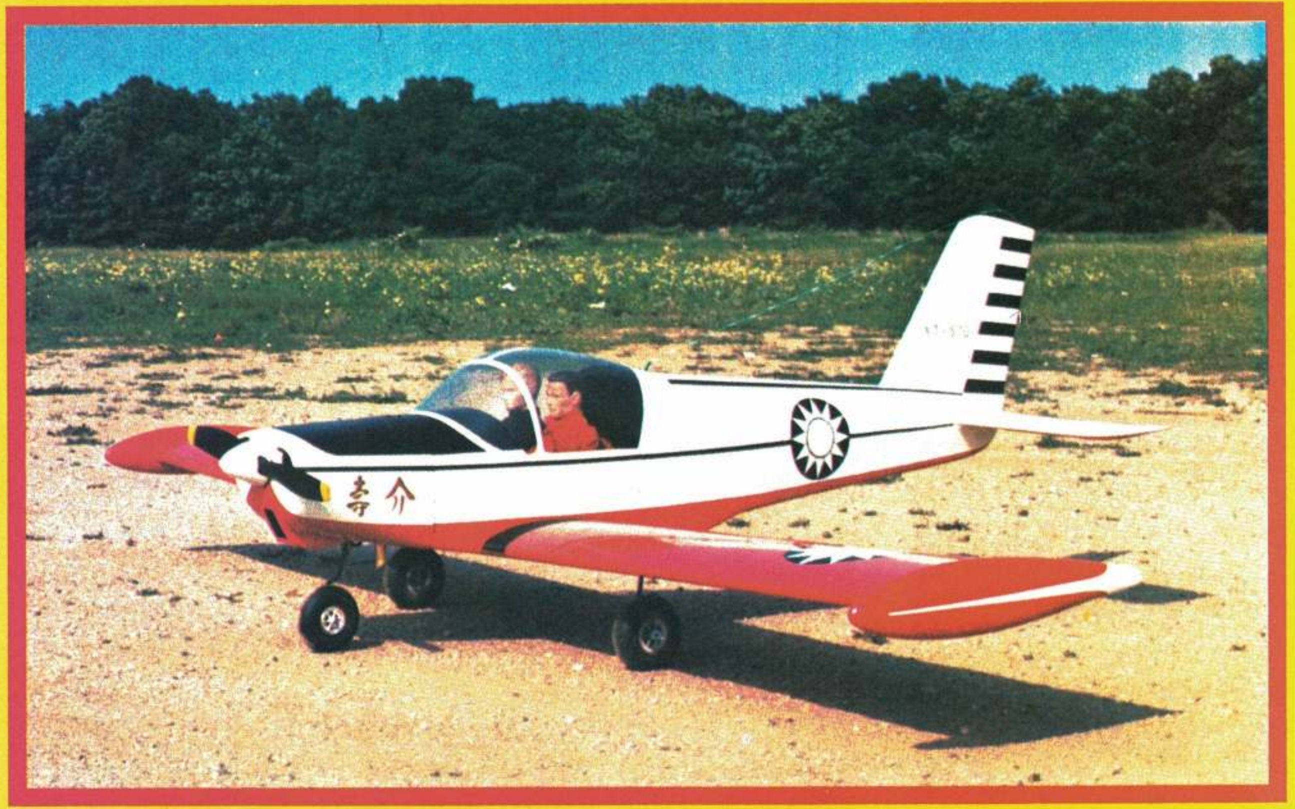


Fernando Ramos' DH-2 CO-2.

Hal Cover's CO-2 Focke-Wulf.

Pazmany PL-1

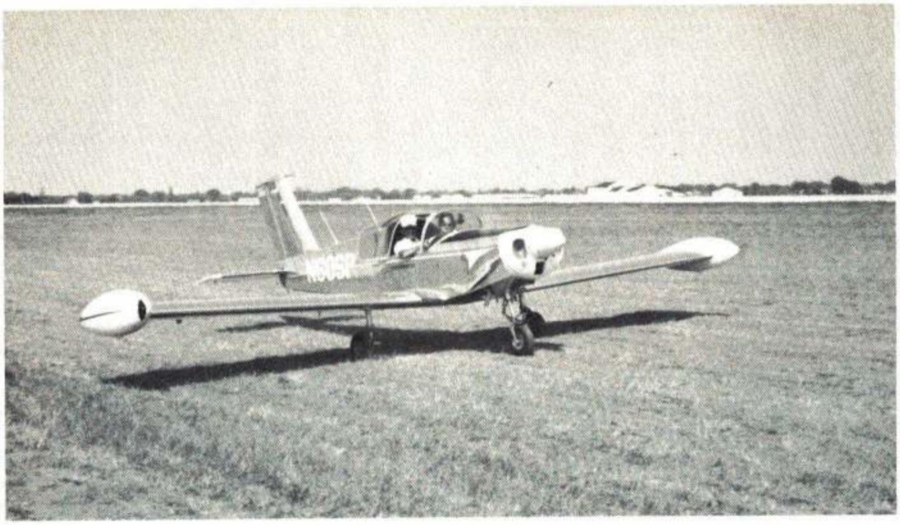
The homebuilt produced by the Chinese Air Force (Taiwan) as their standard trainer makes a great little RC Scale job for competition or sport flying. / by Nick Ziroli



The following is a familiar piece of dialogue that has been repeated as many times as I have brought the PL-1 out to fly: "Gee, that's a nice looking plane. What is it?" "It's a Pazmany." "A what?" "A Pazmany PL-1." "Oh, is it Chinese?" "No it's a California homebuilt design." This last answer either leads to a whole line of new questions or a nod of the head and incoherent muttering.

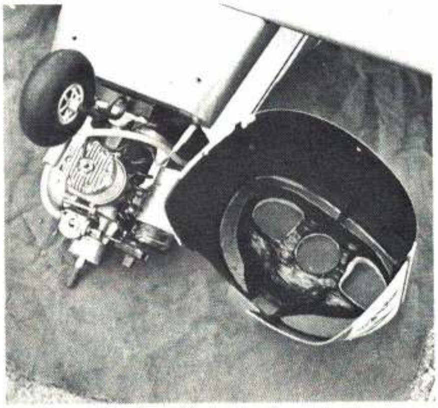
Actually, the Pazmany PL-1 is a Chinese plane of American design. It could be confusing if you don't know the story behind this version of the PL-1.

The original was built by Keith Fowler and John Green in California. (A complete test report on their plane ap-



Sam Pawlowsky's PL-1 won the prize for BEST HOMEBUILT at the 1971 EAA Oshkosh Fly-in. Try silver Super MonoKote on your model to duplicate this plane.

Author removes the cowl to prepare for the first flight. The original is also a fixed gear plane.



Nice and clean before the first run-up. The interior of the wood cowl has been shaped and finished. It entails much less work than fiberglass construction because of the simple curves.

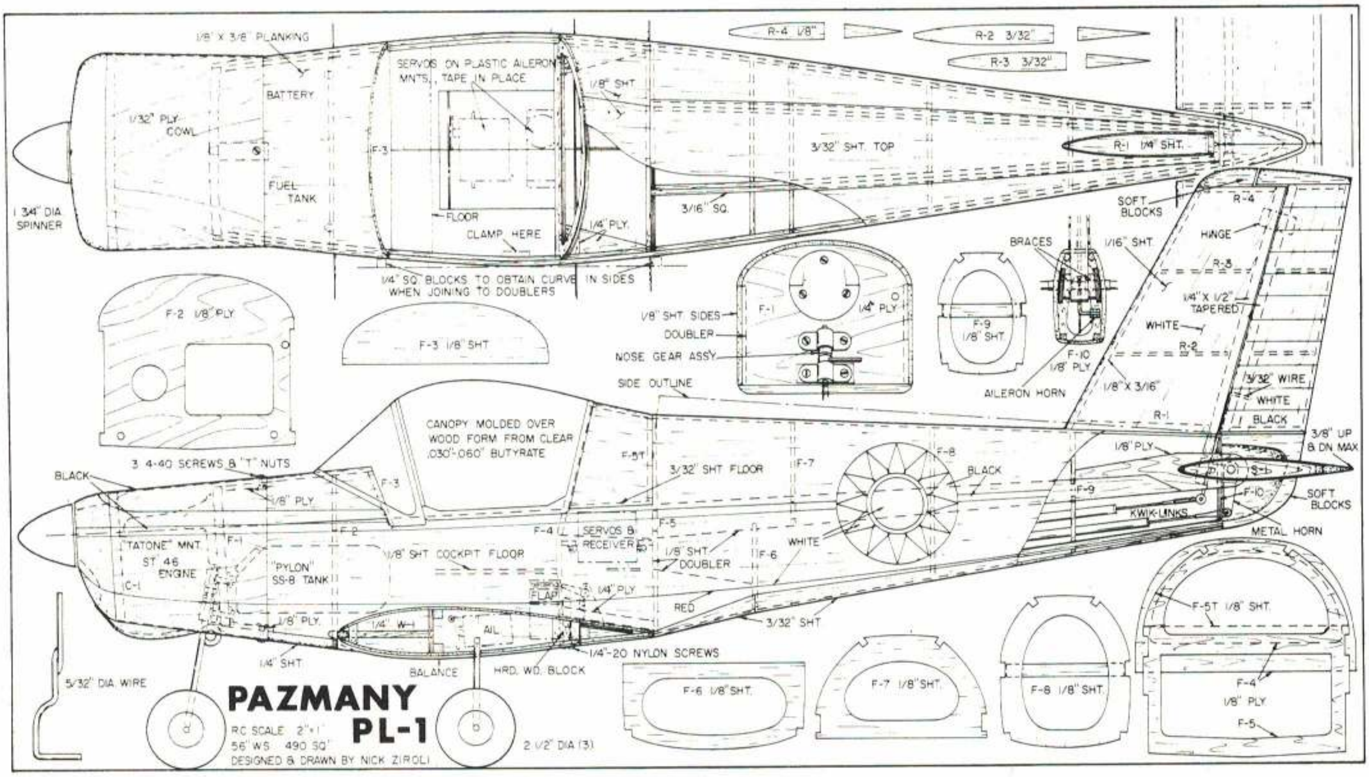
peared in the August-September 1963 issue of *Air Progress*.) The design was conceived by a group of the San Diego chapter of the Experimental Aircraft Association, headed and finally taken over by Ladisalo Pazmany. Plans were made available.

How the Republic of China got involved in home building airplanes is another story. The Chinese Air Force was in need of a training plane for their Air Cadets. They had skilled manpower, but little funds for the program. It was decided that building their own planes, possibly 35 in all, would be the best approach. A thorough study of home-built aircraft was made with the Pazmany PL-1 chosen as the best trainer airplane.

The first aircraft, the one after which ours is modeled, was built and flown in 100 days so it could be presented to President Chiang Kai-shek on the ocassion of his 82nd birthday in 1968. Whether the 35 production planes were ever built I don't know. It would seem to be a practical approach.

Our model is built to a 2"-1" scale which produces a nice compact scale model with good performance. Any maneuver in the AMA scale regulations can be easily performed and the flaps are worth ten points for scale operation. The wingspan is 56 in. with 490 sq. in. of wing area.

The PL-1 weighs about 6½ lb., including nose weight required to properly locate the center of gravity. Rather than stick in a piece of lead, it was decided to put the weight to good use. A "D" size nickel cadmium battery was strapped to the side of the Tatone motor mount. A switch was soldered to the front of the battery that can be



reached through the cowl opening. It is turned on before the engine is started and then left on. This helps make a low reliable idle possible.

Additional weight was obtained by using a Tatone exhaust manifold which is not heavy. The weight came from additional pipes and fittings that were used to make a scale exhaust system. Two openings on the manifold were used with a separate pipe running from each one out through the bottom of the cowl.

The tail-heavy condition was partly due to the location of the receiver and servos which were placed to the rear of the cockpit area to obtain as much room as possible for pilots (a cheap, lightweight version of the "G.I. Joe" type of doll available in most discount department stores). Pilots add a lot to the realism, especially in the air. Although they do not gain any scale points on the ground, in the air the added realism could easily sway a judge for an extra point or two. I've seen so many flight photographs of beautiful scale models in which the absence of a pilot makes them stand out as a model.

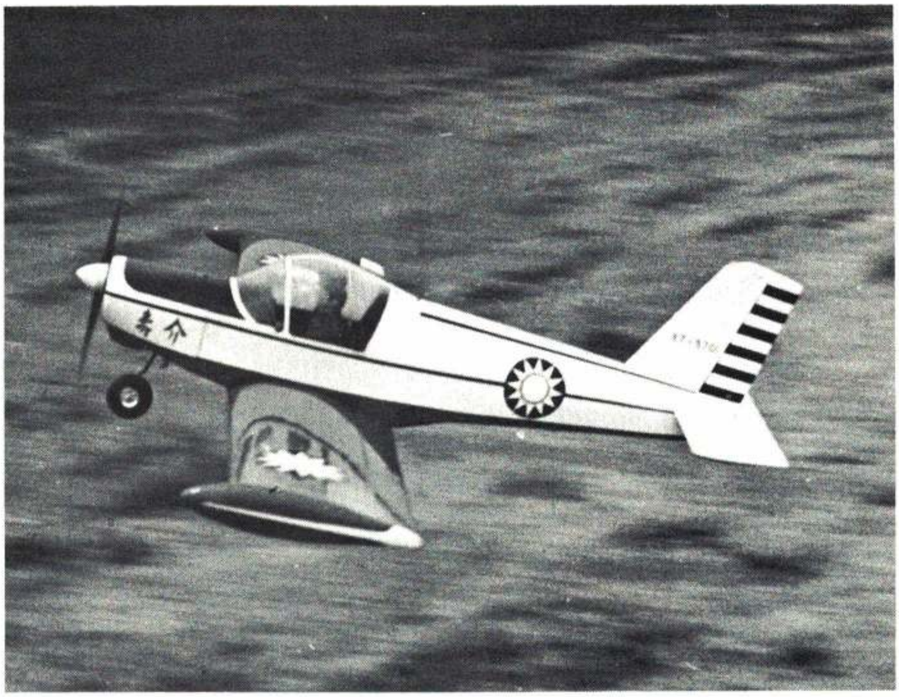
A Supertigre 46 powers our model and has proven to be reliable and a good match for the PL-1. Any 40 to 50 would handle it without any trouble.

The small size of the Micro Avionics servos and receiver make them easy to conceal behind the pilot's seat. The battery is positioned up forward next to the fuel tank.

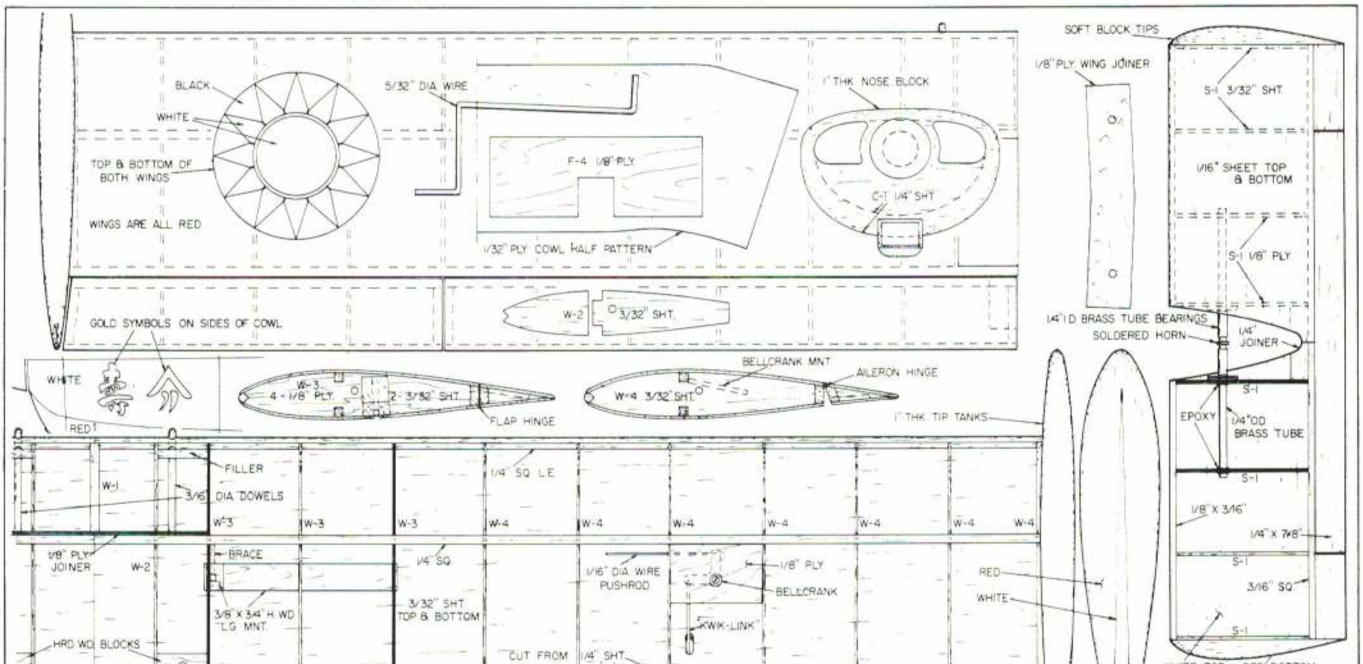
Construction

Although this is not one of the fastest building airplanes around, there is nothing that is overly difficult—just more time consuming. It is not a beginner's project, but a modeler with any amount of construction experience should be able to build it.

(Continued on page 48)



ABOVE: It is a fast and reasonably aerobatic flyer. Here, one can imagine a CAF cadet with instructor turning in on final approach for landing. LEFT: It is rather busy under the cowl. For nose weight a "D" cell nickel-cadmium battery for the glow plug is added. ST 46 provides the power even though the model weighs 6½ lb.



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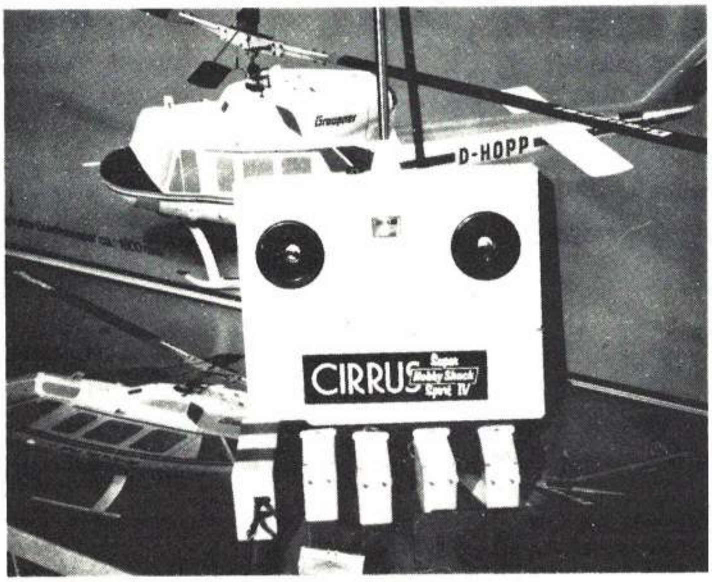

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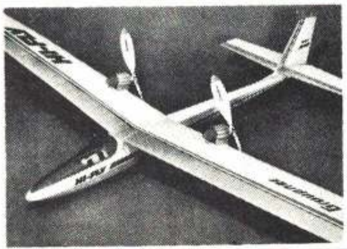

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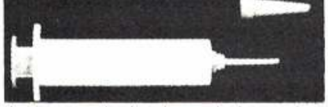

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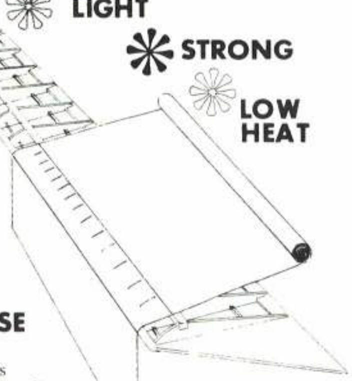

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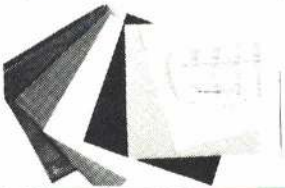

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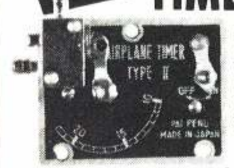

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Pazmany

Select two sheets of light, flexible 1/8 x 6" sheet for the fuselage sides. They may also be glued up from one 1/8 x 4" and 1/8 x 3" sheet. The latter is used for the top rear sides and half a sheet (18") can be used. Cut both sides and the front and rear doublers to shape. Study the plans carefully and cut all the former notches in the doublers. Join the doublers to the sides in a pre-bent manner, by clamping the center and blocking up the ends as shown in the top view. Use white glue or epoxy.

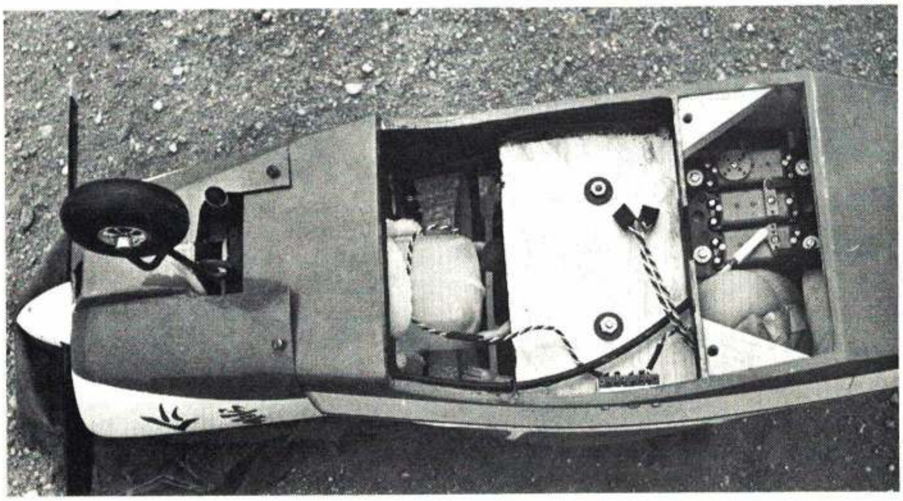
While the doublers are drying, cut out the formers. Glue the rear doublers in place using formers to position them. Join the sides with F-1, F-2 and F-5. Pull the tail together and make ends even—do not cement. This should result in a true fuselage. When dry, add the remaining formers except F-10. Do not try to curve the sides above doublers. Cement the 3/16" square top and bottom stringers in place. Now run cement along the formers and top stringers; pull down in place and hold with tape and rubber bands. Epoxy the 1/8" plywood stabilizer pivot supports and F-10 in at the same time. Run a tube through the holes in the pivot support and align it so it is parallel to a stick laid across the wing saddle.

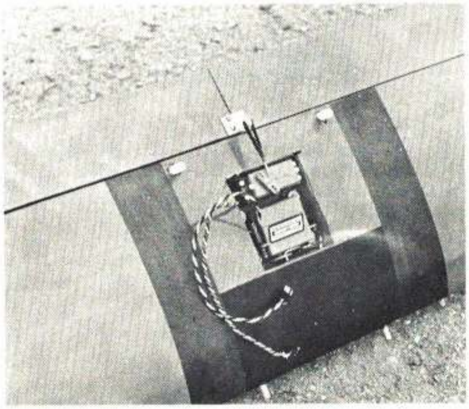
To obtain a more scale-like nosewheel strut, one was bent to shape with a single spring coil to get an offset at the wheel. This offers ample spring action. When forming, bend the coil first and work out from there. The steerable bearing is mounted to F-1 at an angle as shown in the side view. A two-piece bearing was used on the original model. A single-piece bearing such as a Carl Goldberg unit would be easier to use as there would be no alignment problems. Mount it on a hardwood wedge-shaped block. Run the mounting screws through the block and F-1. Epoxy the block in place.

Cover the bottom of the nose with 1/4" sheet (run grain across the fuselage). Plank the top of the nose with 1/8 x 3/8" strips. Sand the sides and stringers to the contour of the formers.

Karlstrom drawings on page 50
Text continued on page 85

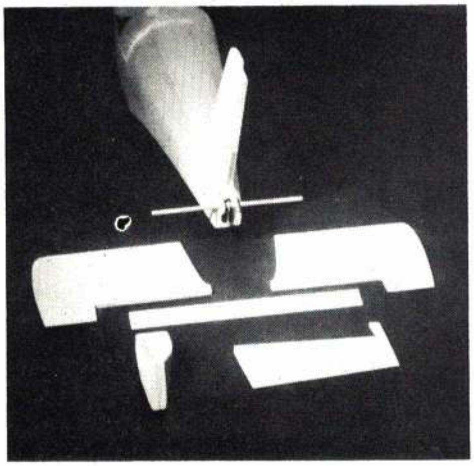
Taxiing back after the first flight. Author reports that the flaps slow the model easily; this makes up for the rather high wing loading and low power loading. Full flap movement for landing, but only small movement for takeoff.

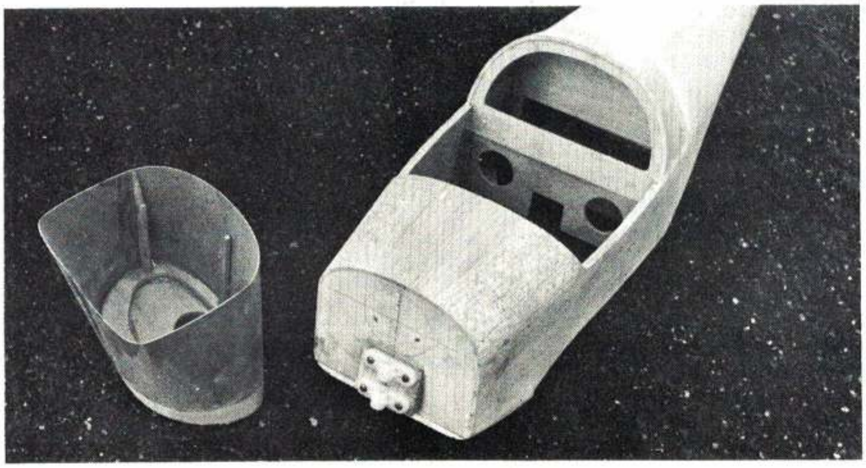




ABOVE: Lots of room in here, but the tank is well back from the engine. Exhaust pressure might be advisable. Cockpit is open for detailing. RIGHT: Two horns joined by the clevis operate the two-segment flaps.

BELOW: All-flying tail unit of real plane was faithfully duplicated. Loads are carried on the spar. BELOW RIGHT: Plywood and balsa cowl is sturdy. Here, it is not shaped inside. Firewall shows the angled nose gear bearings.





Du-Bro "HUGHES 300" semi-scale, R/C HELICOPTER

RADIO CONTROLLED MODEL HELICOPTER KIT

COMPLETE O & R 1.34 CU. IN. GLO FUEL ENGINE, GEAR BOX, AND INERTIA CLUTCH . . . ENTIRE UNIT READY TO BOLT ON

SPECIFICATIONS H-300

OVER ALL DIMENSIONS
LENGTH 59½" . . . WIDTH OF MACHINE AT SKIDS 16" . . . WIDTH OF PASSENGER COMPARTMENT 8" . . . HEIGHT 22½".

PREFORMED PARTS
PASSENGER SEATS . . . INSTRUMENT CONSOLE . . . MANY STEEL, ALUMINUM AND BRASS COMPONENTS ALL CAREFULLY MACHINED OR PRE-FORMED, READY TO BOLT TOGETHER . . . CLEAR PLASTIC CANOPY . . . ONE PIECE AIRCRAFT PLYWOOD SIDE FRAMES FOR THE FUSELAGE UNIT.

ENGINE
O & R 1 34 CUBIC INCH DISPLACEMENT . . . CUSTOMIZED FOR GLO FUEL BY DU-BRO PRODUCTS . . . SPECIAL R/C CARBURETOR DESIGNED AND MANUFACTURED BY DU-BRO PRODUCTS . . . USES REGULAR R/C GLO PLUGS . . . PULL STARTER BUILT IN . . . GEAR BOX AND CLUTCH ARE ALL ONE UNIT, READY TO BOLT IN PLACE . . . FUEL TANK SUSPENSION BRACKETS ARE DESIGNED TO CARRY A SULLIVAN 12 OZ. SS 12 PLASTIC TANK (INSTALLATION OF LARGER TANKS EASY TO DO BY THE INDIVIDUAL OWNER.)

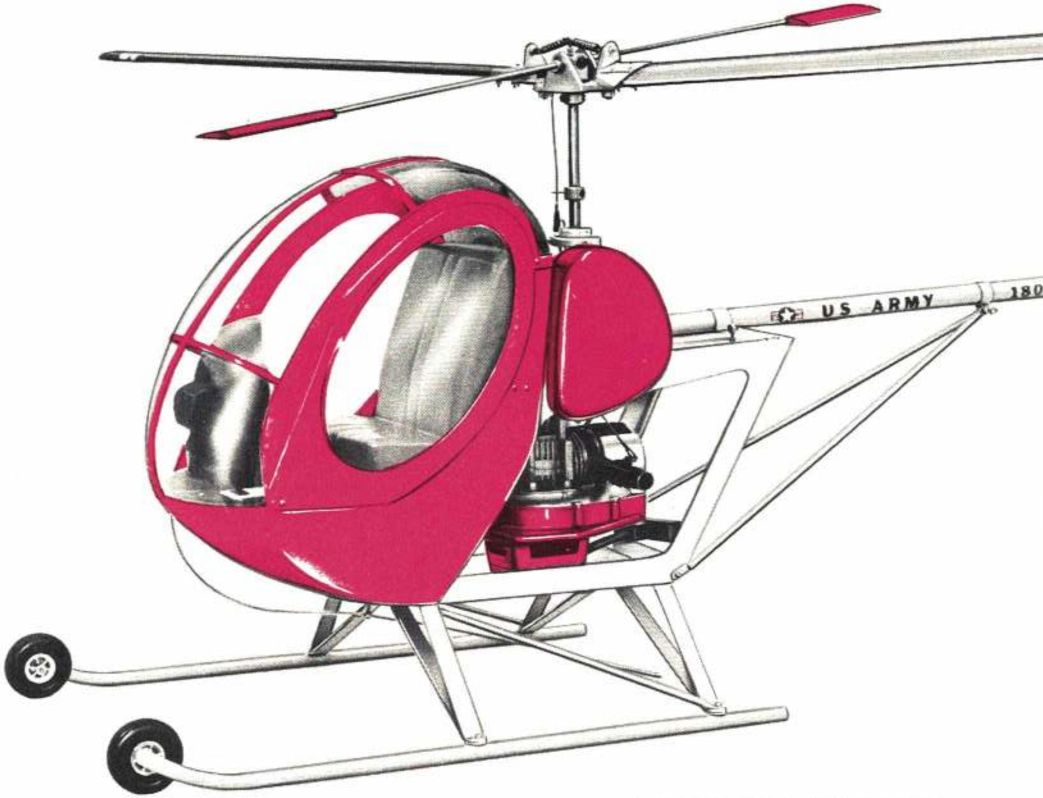
MAIN ROTOR (SHAPED)
BASS WOOD . . . SPAN 57¼" . . . CHORD 2" . . . AIRFOIL, HIGH LIFT SECTION . . . HILLER TYPE SEMI-RIGID ROTOR.

TAIL ROTOR (SHAPED)
BASS WOOD . . . DIAMETER 12½" . . . CHORD 1 3/16"

FLY BAR
STEEL ROD . . . SPAN 28½" FLY BAR WEIGHTS, EXTRUDED ALUMINUM, AIR FOIL SECTION.

WEIGHT
FLYING WEIGHT WITH FULL TANK APPROX. 14 POUNDS.

PERFORMANCE DATA
TOP SPEED FORWARD ESTIMATED AT 70 MPH . . . PROPERLY TRIMMED, WILL FLY HANDS OFF . . . ALTITUDE, OUT OF SIGHT . . . CLIMBING STALLED TURNS . . . STEADY HOVERING . . . EXCELLENT CONTROL ON VERTICAL RISE OR DESCENT 360° TURNS HOVERING OVER ONE SPOT . . . FLIES FORWARD, BACKWARD OR SIDEWAYS . . . HAS BEEN FLOWN WELL IN 40 MPH WIND GUSTS.



"THE DU-BRO HUGHES 300"

CAN YOU PICTURE A RADIO CONTROLLED FOURTEEN POUND FLYING HELICOPTER MODEL THAT DIVES, ZOOMS, DOES STALL TURNS, VERTICAL BANKS, SNAP TAIL TURNS, FLIES FORWARDS OR BACKWARDS, OR SIDE TO SIDE, CAN RISE AND HOVER OVER ONE SPOT? AN AIRCRAFT POSSESSING SO MANY REFINED DESIGN FEATURES IT'S A PLEASURE JUST TO LOOK AT IT.

ADVANCED R/C MODELERS AND FLYERS CAN NOW OWN SUCH AN OUTSTANDING AIRCRAFT . . . "THE DU-BRO HUGHES 300" HAS ALL OF THESE FINE PERFORMANCE FEATURES PLUS DESIGN AND MANUFACTURING QUALITIES THAT ARE THE ULTIMATE IN THE ART AS IT STANDS TODAY . . . THIS BEAUTIFUL MACHINE IS A "BOLT TOGETHER" ASSEMBLY WHICH, OF COURSE, MEANS MAINTENANCE, REPAIRS OR PARTS REPLACEMENT CAN BE ACCOMPLISHED WITH EASE . . . AN OVERSIZED UNDER CARRIAGE AND "LANDING SKID ASSEMBLY KIT" IS ALSO AVAILABLE FOR TRAINING R/C PILOTS JUST GETTING INTO THE CHALLENGING AND FASCINATING SPORT OF R/C MODEL HELICOPTER FLYING. $350

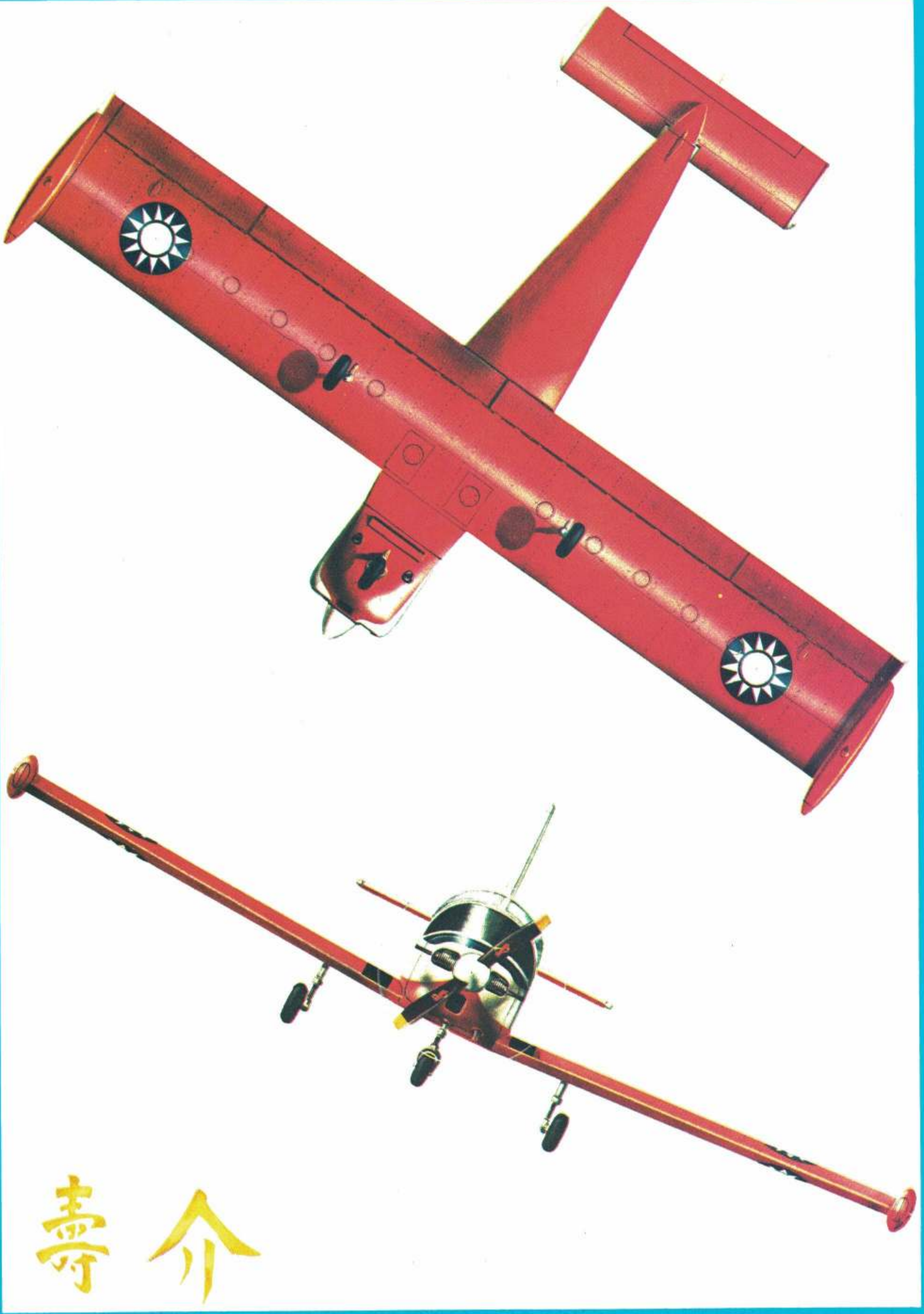
designed and manufactured by **DU-BRO PRODUCTS INCORPORATED** wauconda, illinois 60084 u.s.a.

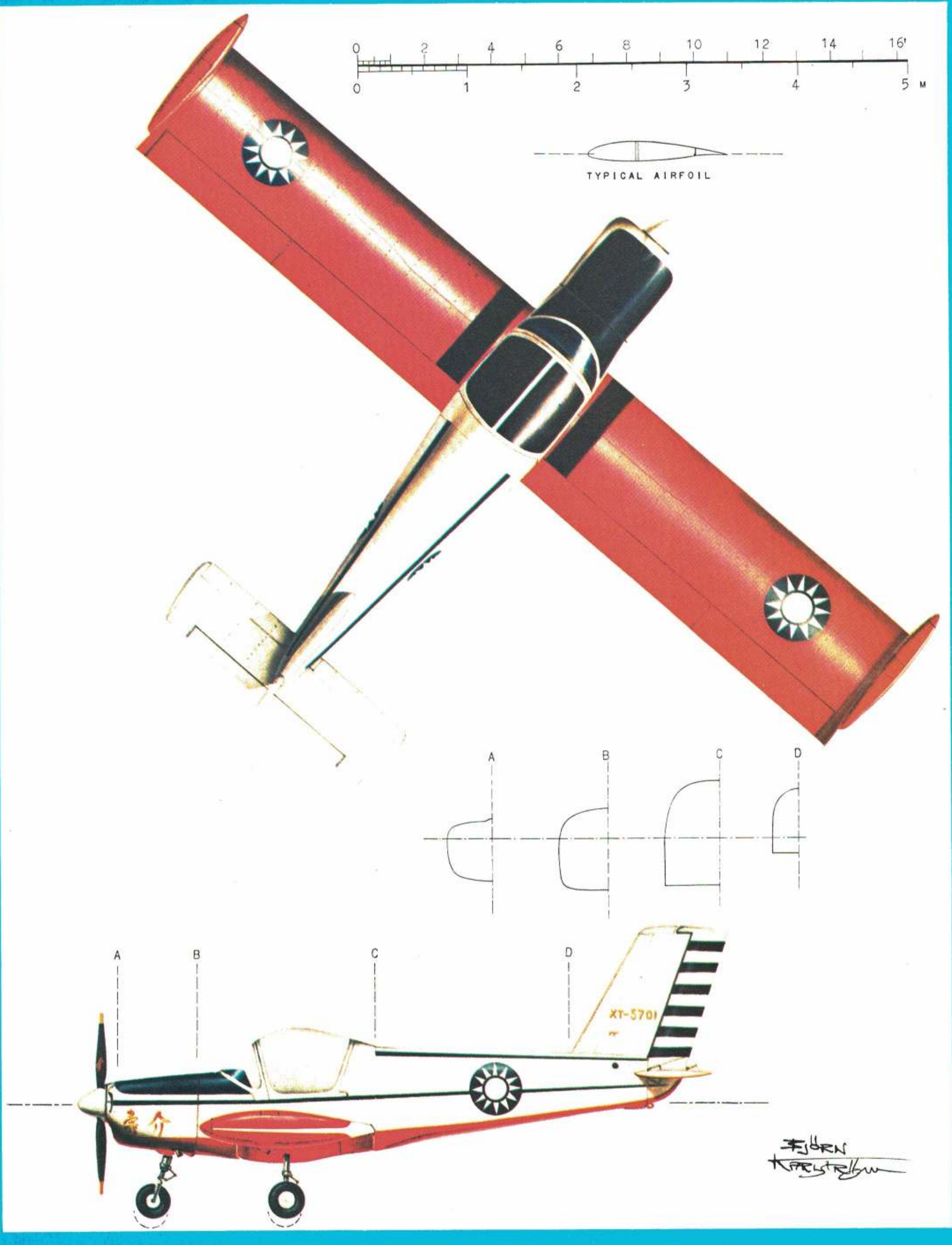
*RADIO EQUIPMENT . . . EPOXY . . . FUEL TANK . . . GLO PLUG . . . 225T WHEELS AND DECORATING MATERIALS NOT INCLUDED WITH KIT

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

MAIL ORDERS F.O.B. FACTORY

Pazmany PL-1

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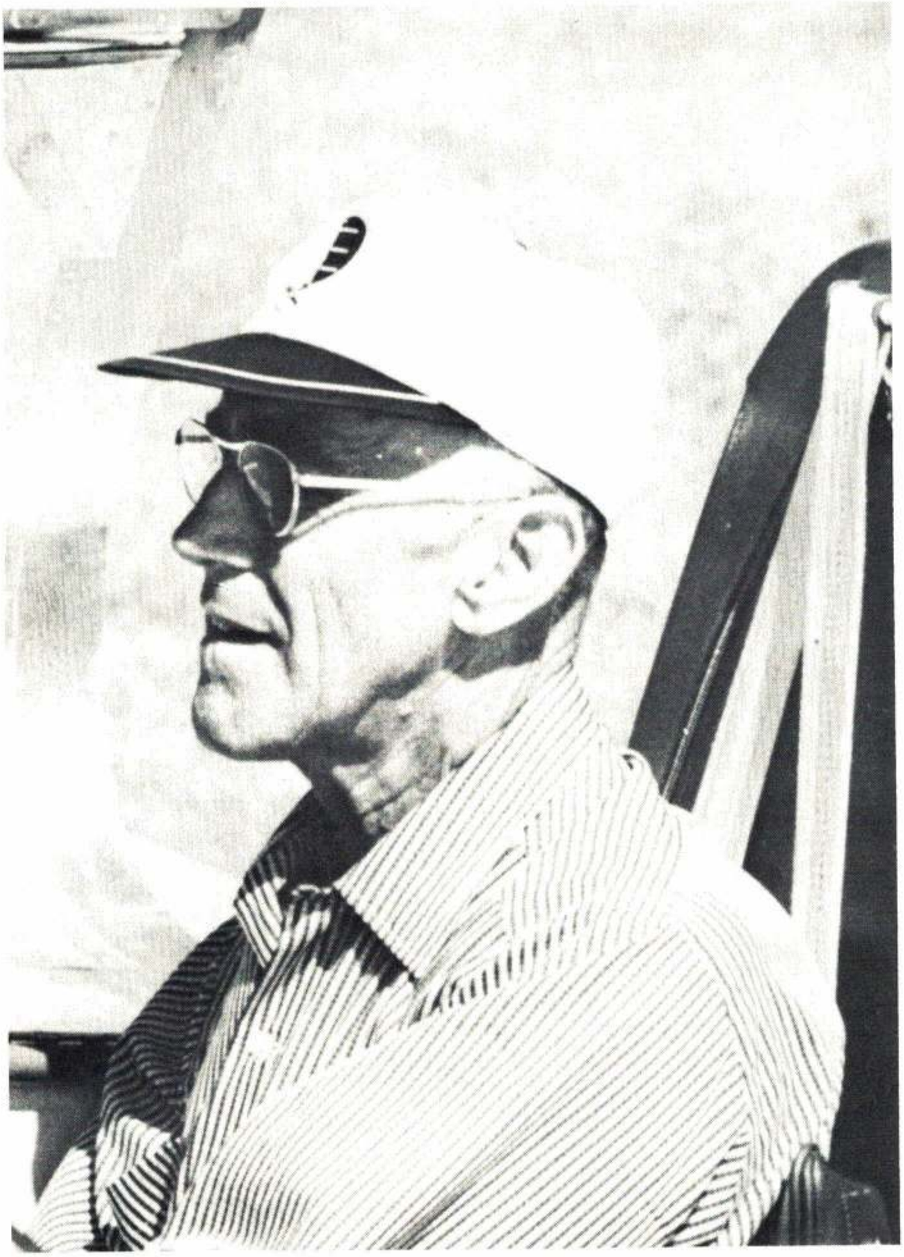


"Witt's V," like all his other racers, is faster than it looks. The simple lines are very efficient.

by Don Berliner and Bob Pauley

Some people just don't know when to quit. Like, for instance, Steve Wittman.

In the Spring of 1974, he'll be 70 years old. That's the time to sit back and reflect on more than 40 glorious years of designing and building and flying some of the most exciting airplanes the world has ever seen; and on a lifetime of showing the aviation world that there's a simpler, cheaper way of doing what other people insist on doing in complicated, expensive ways. The spring-steel landing gear on the past 25 years' worth of fixed-gear Cessnas is one of Steve's clever inventions. And a 125 hp two-place lightplane that cruises 50 percent faster than anything the industry has been able to create? Well, his Tailwind does that with ease.

Steve has had more harrowing experiences than most people can imagine. Like the time he was shot down while flying over the Great Smokey Mountains and came out of it without a scratch. Or like the time, many years ago, when his engine quit during a race and he landed on top of an Army bomber! Or the time he threw a prop blade while flying out over the middle of Lake Michigan in his Tailwind—and glided back to his home field to land with an ice-cold engine.

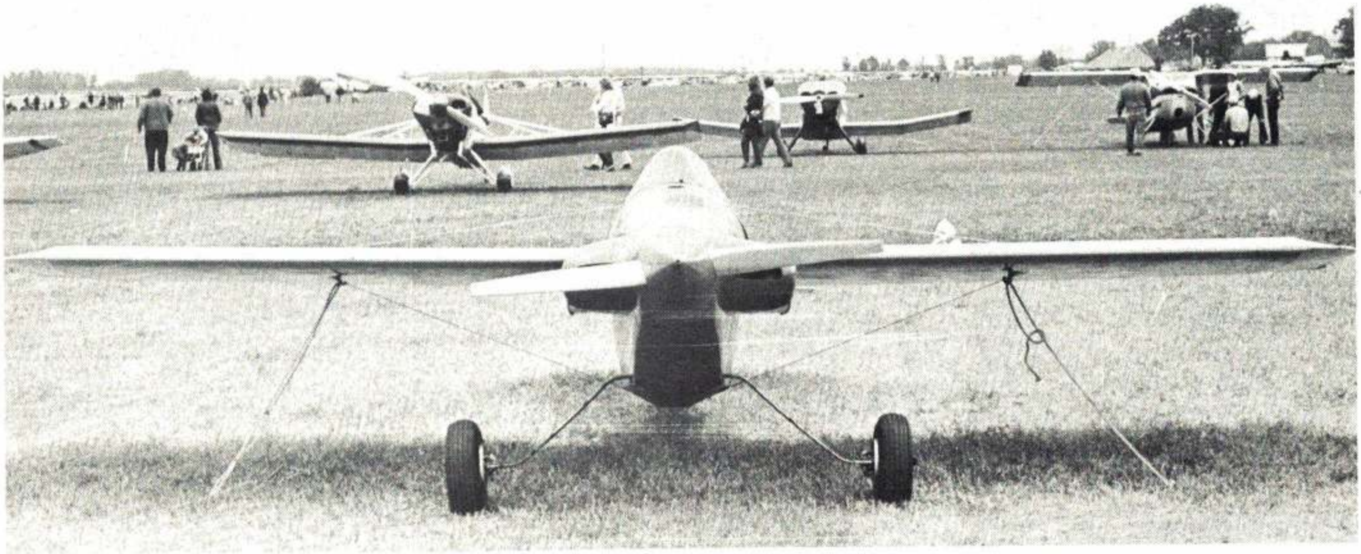
Even that sampling would be enough for any one person, no matter how talented. But small, fast airplanes have been so much a part of Steve Wittman's life, that neither age nor retirement could interrupt their romance. In fact, the extra spare time afforded by retirement was just what Steve needed to enable him to start on some of the projects he'd been thinking about for years.

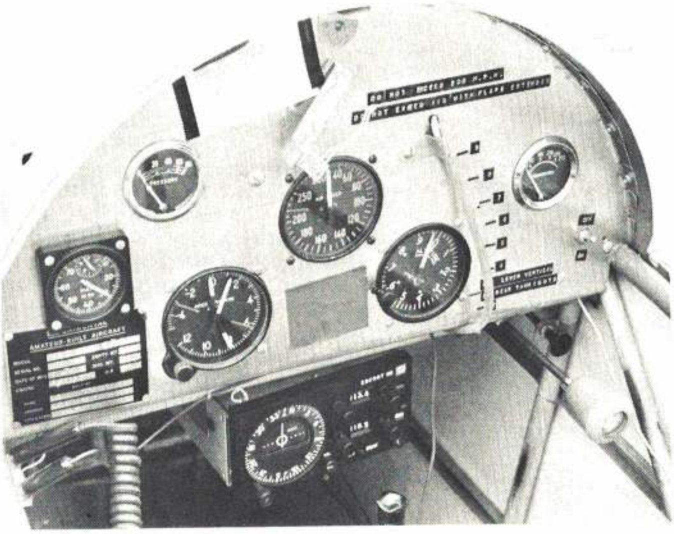
Priority Number One went to a Volkswagen-powered sport racer for the new Formula Vee racing class. The idea of building an airplane suited not only for racing, but also for low-cost sport flying really appealed to Steve. And using a car engine in a homebuilt airplane was another idea with all sorts of potential, especially in view of the steadily rising cost of the few small aircraft engines still available.

Steve had been in on the beginnings of Formula Vee, back in March of 1964. The men planning an "aerial Olympics" for Palm Springs, Calif., wanted a new class of homebuilt racers, and so Formula Vee was created (it was then the 95 cu. in. class) from an idea then being worked on in England. The Palm Springs extravaganza was pretty much of a flop. Formula Vee was more so. There wasn't a single airplane off the drawing board, let alone in the air.

As the 1960s dragged on, sport racing type people went in the direction of the established Sport Biplane Class and Formula I. These classes were growing well, but not so well that a lot of people and money could be siphoned off to

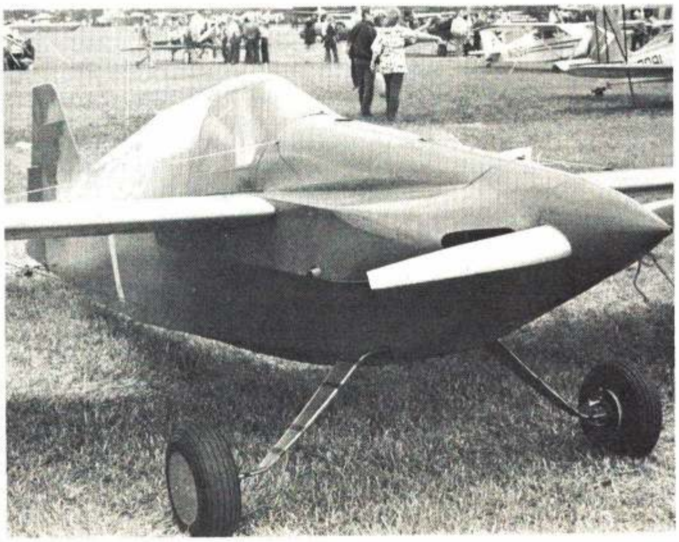
Volkswagen?

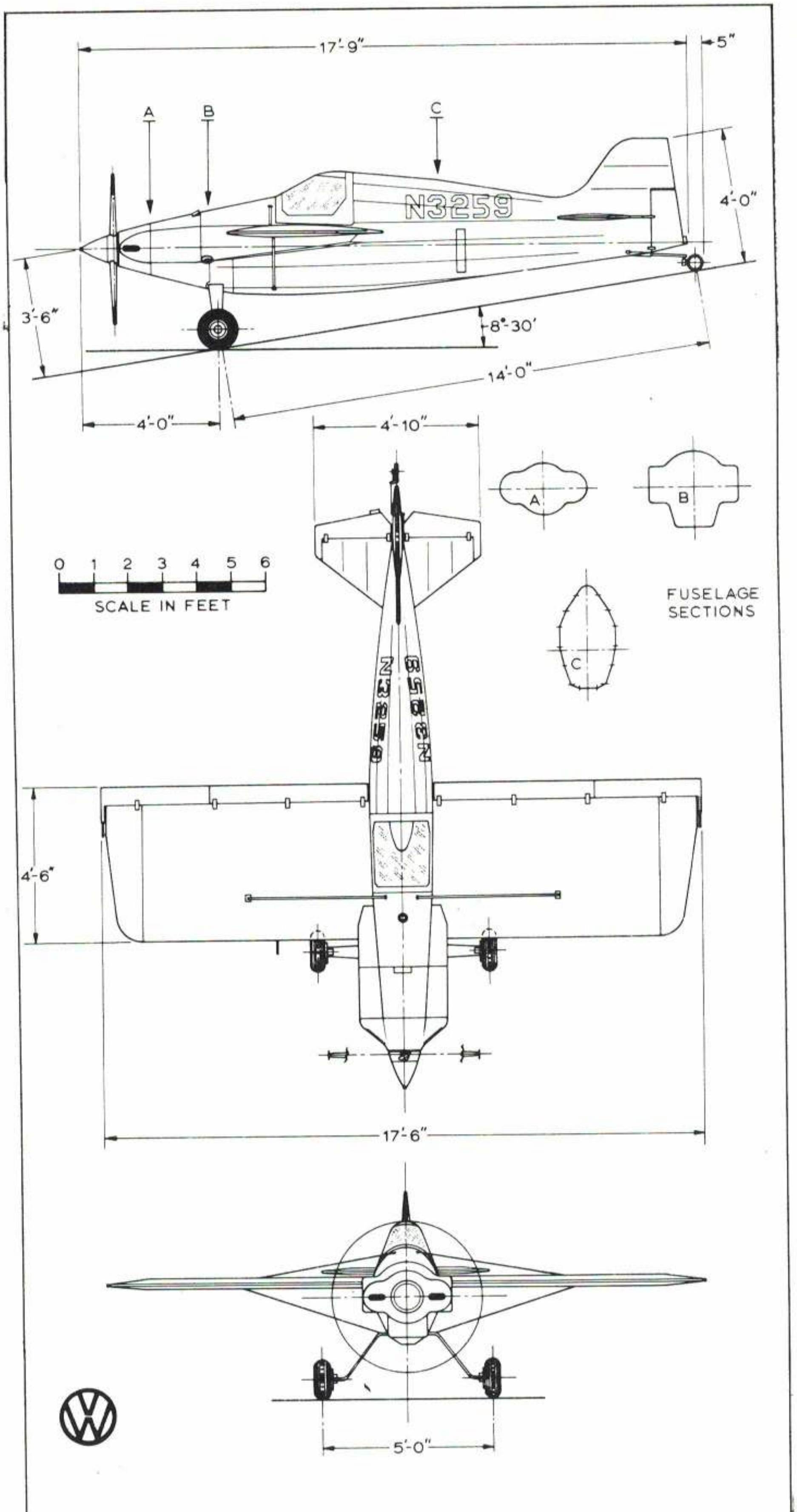




OPPOSITE: The Grand Old Man of Air Racing, Steve Wittman, looks forward to his 70th birthday and to his first race in his Formula Vee racer. **ABOVE:** The shortest route to speed is aerodynamic cleanliness. Witt's Vee has no more than the absolute minimum frontal area and a very thin wing. **LEFT:** The instrument panel of Witt's Vee: Simple and lightweight. (From Left): Manifold pressure, oil pressure, G-meter, airspeed, altitude, oil temperature. **BELOW LEFT:** The critical area where the wing meets the fuselage. The square-sided cowling is easier to build and just as clean as one with flowing lines. **BELOW:** Landing gear struts are of titanium. Wheel pants will come later.

Photos by the Authors





WITT'S V

STEVE WITTMAN'S VW POWERED FORMULA "VEE" RACER

DRAWN BY ROBERT F PAULEY

start a new class without risking serious damage to the old ones. Formula Vee just sat there, whimpering.

Finally, in 1969, the first pieces of metal were cut. And even though there was no immediate prospect of a race, Steve Wittman rolled his Witt's V out for public view during the first EAA Fly-In to be held at Wittman Field, Oshkosh, Wisconsin. The 1970 Fly-In was held at the field he had managed from 1930 until the late 60s; his home and hangar/shop are just across the runway.

The airplane so eagerly awaited by homebuilders and race fans alike must have been something of a disappointment. It was an oversized Formula I: angular, hump-backed and painted a garish green with yellow wings. It wasn't particularly sleek. It certainly wasn't very pretty. And it didn't look very fast.

But it was by Wittman. His Tailwind fits the above description more or less, and it's darned fast. Sporting aviation people have long since learned not to scoff at anything from the wise old hands of Steve Wittman, and so they looked very carefully.

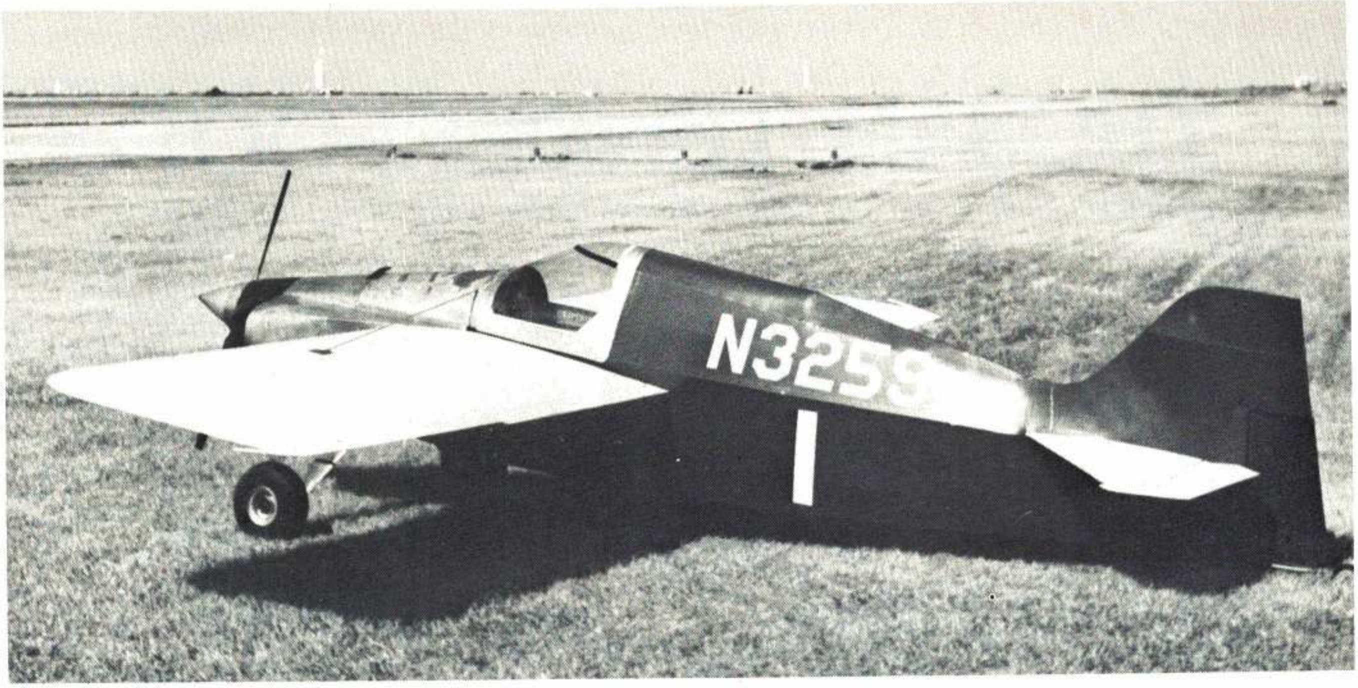
What they saw was the shape of things to come—just like his Buster had shown them in the first Formula I race at Cleveland in 1947. For the first decade of Midget Racing, practically everyone who had started off in some other direction, eventually came around to Wittman's way of doing things. That was because Steve's homely little racers won most of the races in those days.

He won races because his airplanes were clean and light and simple. They got off fast and they got around the turns with a minimum loss of speed, and they rarely failed to finish a race due to mechanical problems. This philosophy has worked for Wittman for many years, and he sees no reason to change it. The new little VW machine was simply more of the same.

With an empty weight of 435 lb., and the required minimum wing area of 75 sq. ft., he came up with a wing loading, at racing weight, of about 8 lb. per sq. ft. This means such tight pylon turns that not even the most nimble of Formula Is could hope to keep up with him around the turns. Several tried it in an exhibition race and watched him leave them flat at the corners.

One way he kept the weight down was to use thin wires to brace the wing, so he could get by with a much lighter wing spar (and faster airfoil) than airplanes having cantilever wings. A bonus advantage of this is the elimination of the spar sticking through the cockpit—any extra room for the pilot can be a blessing on cross-country flights.

One of the big problems with VW-powered airplanes has been the high drag of the blunt nose, for the famous German car engine is not meant to be tucked into a streamlined airplane cowling. Steve turned the engine around (so it runs the right way and he can use standard propellers), and built a special housing for a long extension prop shaft. With the widest part of the engine far behind the prop, a super-sleek cowl could then be built.



Classic Wittman lines: Boxy, with a strange combination of curves and points. But it's the first one across the finish line that wins. . .not the prettiest.

Construction is basically conventional. The wings are of spruce with plywood covering. The fuselage and tail are built up of chrome-molybdenum steel tubing and covered with fabric. Only the landing gear is different, with all struts having been machined from titanium stock—light but rather springy.

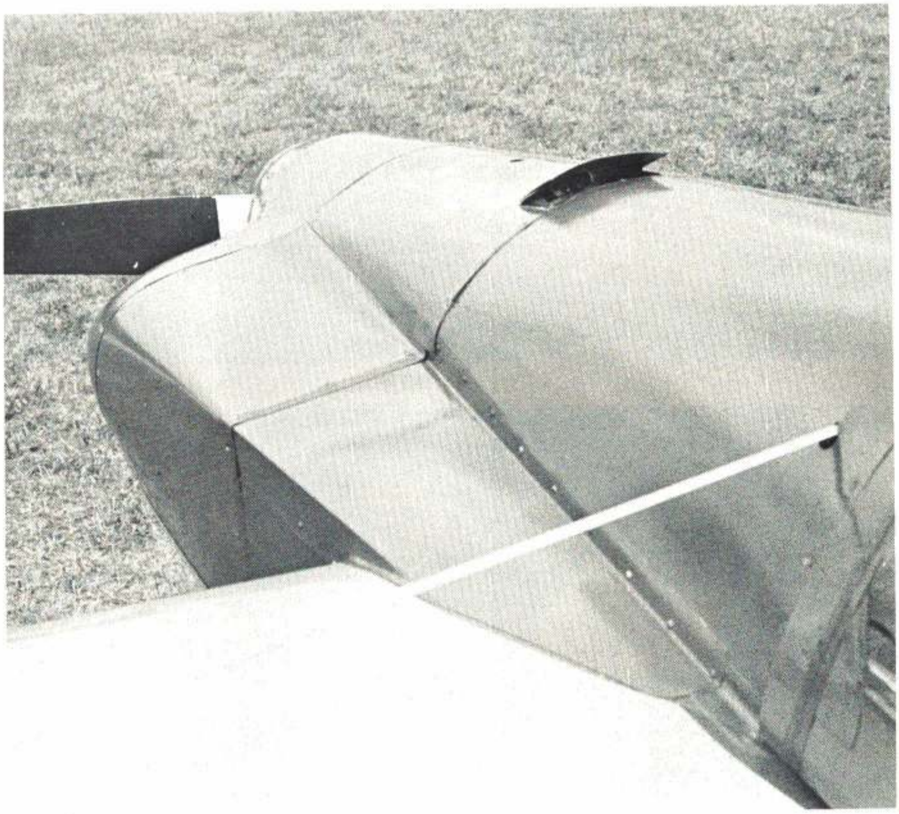
Even after the airplane flew in late 1970, development moved slowly, for there were no other Formula Vees in the air, hence no races coming up. Steve wasn't satisfied with the center of gravity of his little bird, and made a major change in the location of the wing. The engine, too, gave problems, for he was exploring unknown territory in the use of a VW engine in a high performance airplane. Prior to his racer, VW-powered lightplanes had been operating in the 100-130 mph range. He passed by this without a pause, and then 150 mph, and then 170 mph.

As he slowly built up hours on his new No. 1, he became more and more pleased with its handling characteristics and speed range, and this was what he wanted. Soon, spectators at fly-ins and airshows were witnessing aerobatics displays by Wittman and his little Vee: Rolls on top of loops, snap rolls, and even the rarely seen falling leaf. From a minimum speed of around 45 mph right on up to the top speed of at least 175 mph, it flew without a bad habit.

Its first time on a race course came, appropriately enough, at Cleveland, during the 1971 Formula I races at Lakefront Airport. To get there, Steve hopped into his flying Volkswagen and covered the 500 miles from Oshkosh in just three hours flying time. His few laps were strictly an exhibition, but he showed a lot of people that his low-powered sport plane could not only fly cross-country in fine style, but also wrap itself around a tight pylon course like a true racer.

By now, a second Formula Vee design had flown and was attracting a

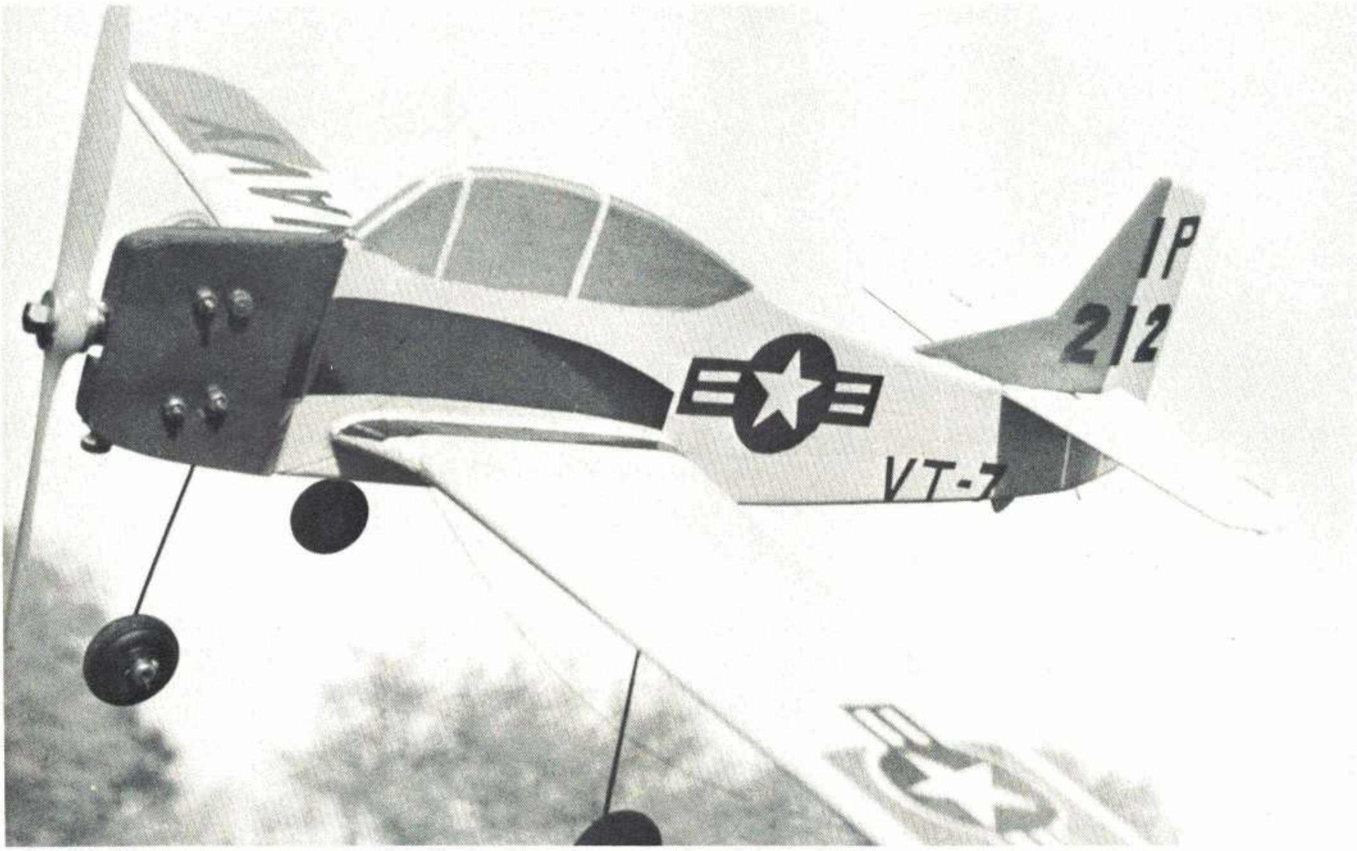
(Continued on page 80)

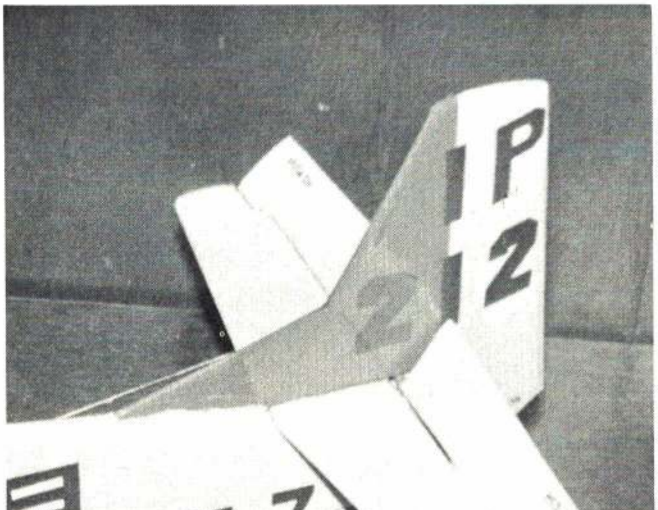


A long prop extension permits the sharpest nose of any VW-powered engine.

TROJAN TENDERFOOT

This rugged WWII military trainer promises building fun and flying pleasure. / Fred Beseler

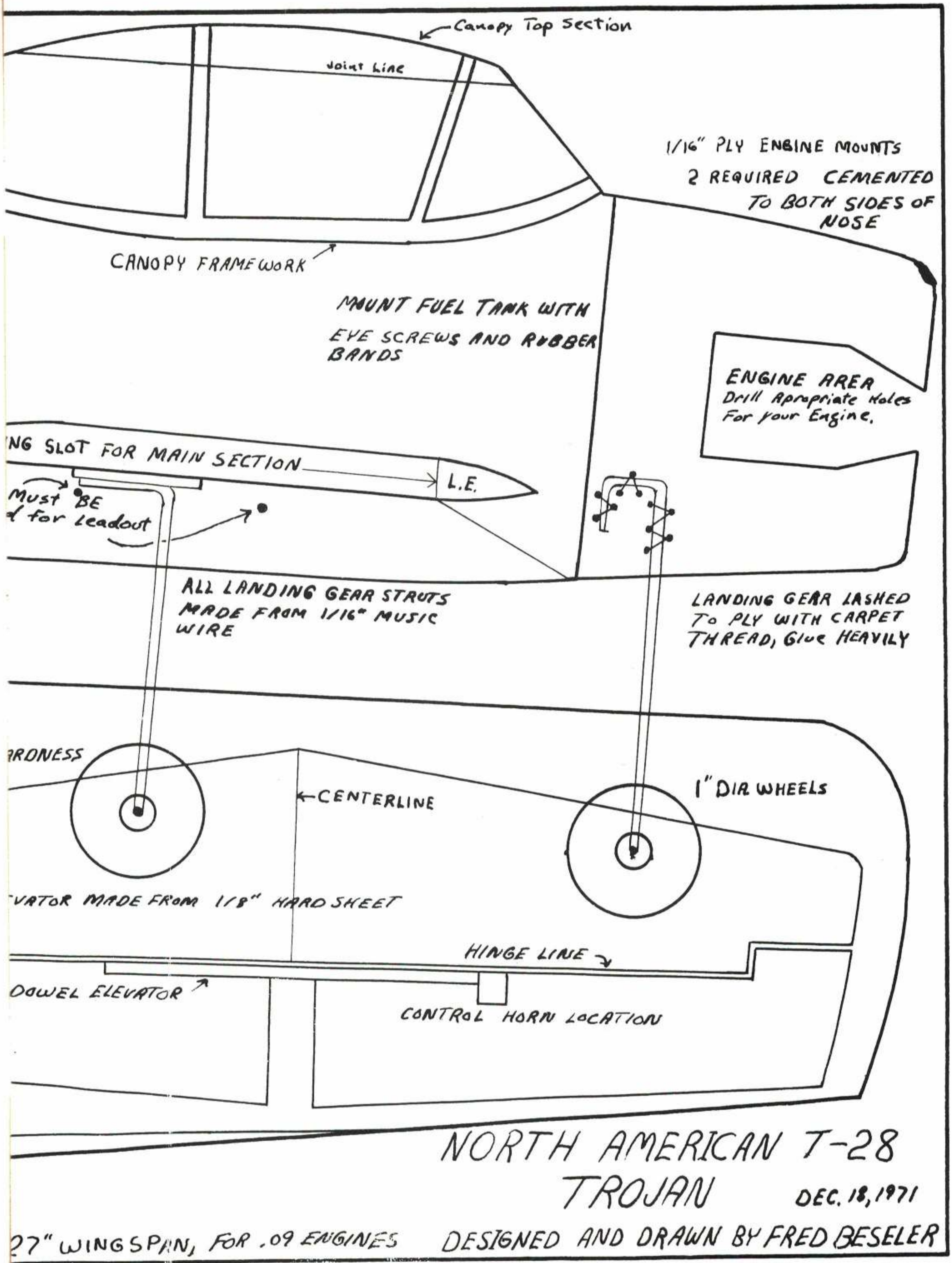




TOP: The T-28's bold outline fits even the most basic color schemes. Navy versions, usually the most popular, have easy straight lines to paint. Easy, smooth lines can be achieved with basic building skills. ABOVE: Large amount of elevator travel shown here is not necessary for good performance, but a free-moving linkage is!

The main reason that I built a T-28 Trojan was because I had just purchased a brand new Enya 09 engine and I needed an airplane to serve as a test plane for it. I have always liked the T-28 ever since I saw a real one at an airport a couple of years ago. When I finally got my hands on a three-view drawing of the Trojan, I decided to go ahead and build one.

The real T-28 was designed and built by North American Aviation. The T-28 first flew on September 24, 1949. It was the first two-seat advanced trainer built since WWII, as well as the first to have tricycle landing gear. The tricycle landing gear makes takeoffs and landings in both the real airplane and the model much simpler. The real T-28 is powered by a Wright engine of 1425 hp which


Canopy Top Section
Joint Line
1/16" PLY ENGINE MOUNTS
2 REQUIRED CEMENTED
TO BOTH SIDES OF
NOSE
CANOPY FRAMEWORK
MOUNT FUEL TANK WITH
EYE SCREWS AND RUBBER
BANDS
ENGINE AREA
Drill Apropriate Holes
For your Engine.
NG SLOT FOR MAIN SECTION
L.E.
Must BE
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ALL LANDING GEAR STRUTS
MADE FROM 1/16" MUSIC
WIRE
LANDING GEAR LASHED
TO PLY WITH CARPET
THREAD, Glue HEAVILY
RDONESS
CENTERLINE
1" DIA WHEELS
VATOR MADE FROM 1/8" HARD SHEET
HINGE LINE
DOWEL ELEVATOR
CONTROL HORN LOCATION
NORTH AMERICAN T-28
TROJAN
DEC. 18, 1971
27" WINGSPAN, FOR .09 ENGINES
DESIGNED AND DRAWN BY FRED BESELER

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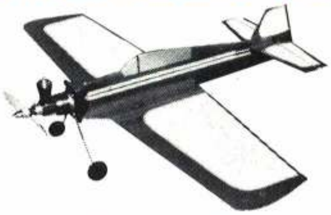

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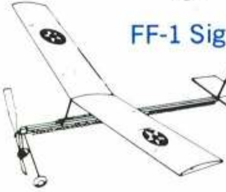
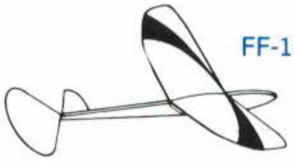


FF-13 Pigeon - 79¢



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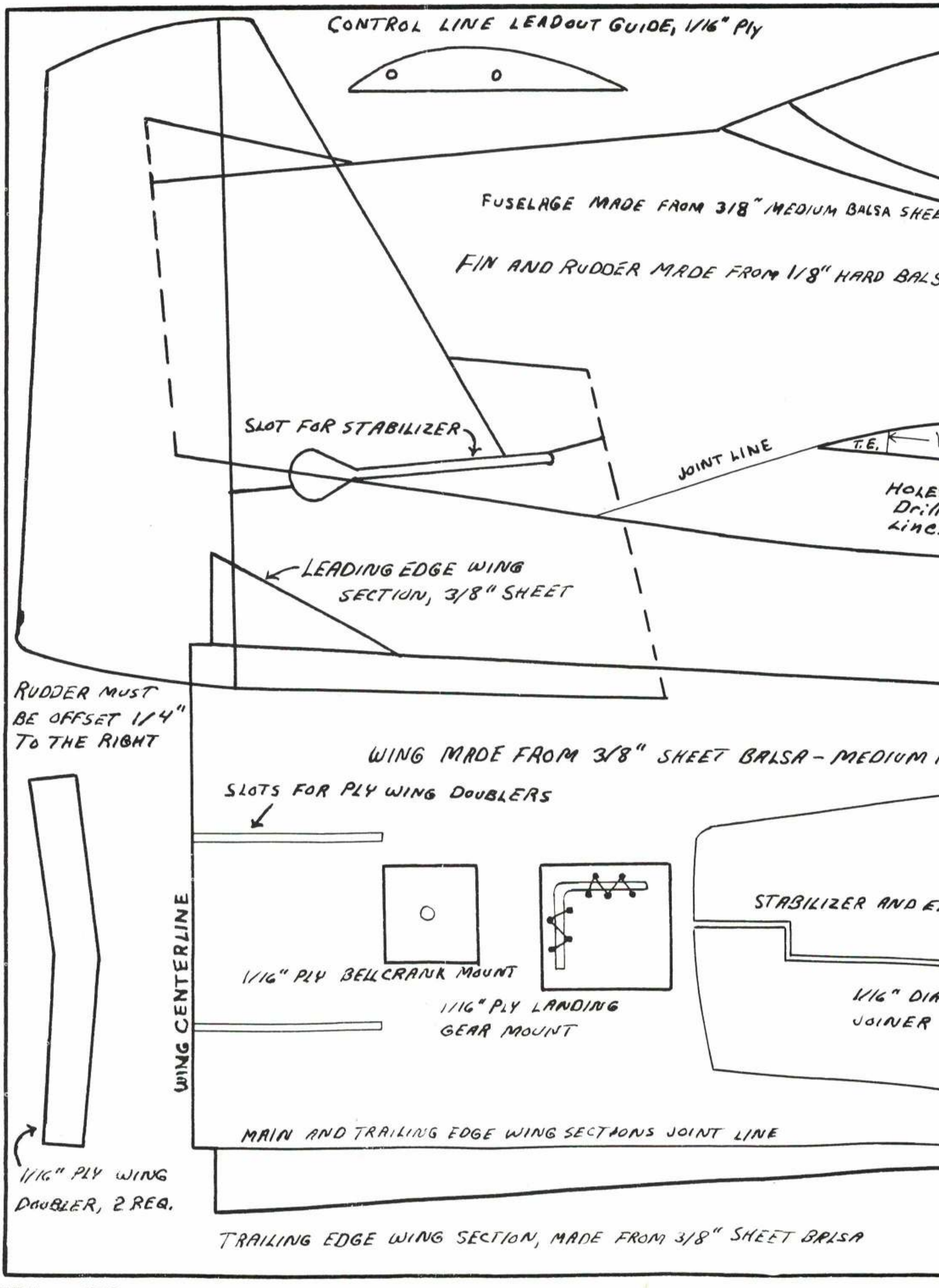
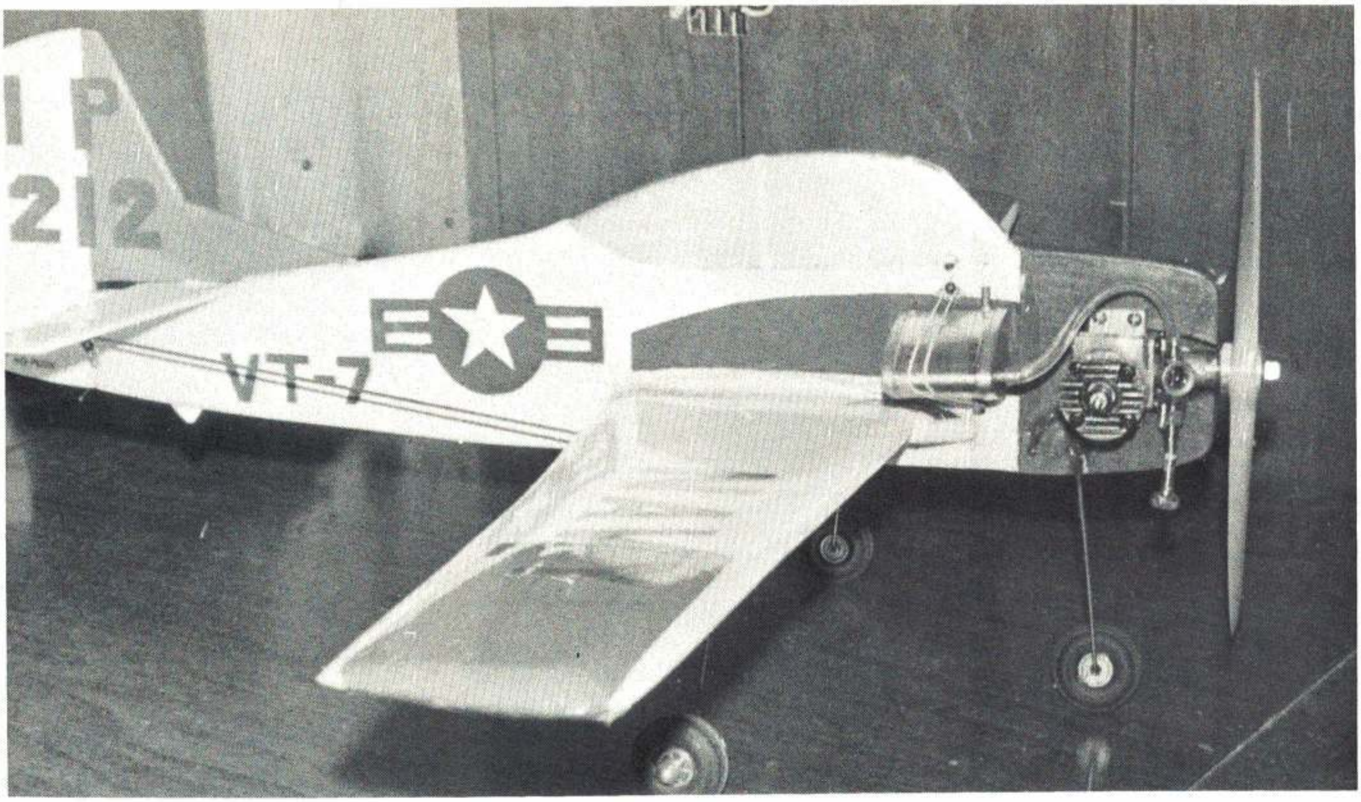

CONTROL LINE LEADOUT GUIDE, 1/16" Ply
FUSELAGE MADE FROM 3/8" MEDIUM BALSA SHEE
FIN AND RUDDER MADE FROM 1/8" HARD BALS
SLOT FOR STABILIZER
JOINT LINE
T.E.
HOLE
Drill
Line
LEADING EDGE WING SECTION, 3/8" SHEET
RUDDER MUST BE OFFSET 1/4" TO THE RIGHT
WING MADE FROM 3/8" SHEET BALSA - MEDIUM
SLOTS FOR PLY WING DOUBLERS
STABILIZER AND E
WING CENTERLINE
1/16" PLY BELLCRANK MOUNT
1/16" PLY LANDING GEAR MOUNT
1/16" DIA
JOINER
MAIN AND TRAILING EDGE WING SECTIONS JOINT LINE
1/16" PLY WING DOUBLER, 2 REQ.
TRAILING EDGE WING SECTION, MADE FROM 3/8" SHEET BALSA



Tank is held with rubber bands—quick and simple. Note that the needle valve is below the engine where a little caution would save a lot of bandages.

gives the T-28 a top speed of 346 mph—almost as good as many WWII fighters! The T-28 has a wingspan of 40 ft. and a length of 32 ft. The model's wingspan is 27 in. and its length is 18 in. It is designed for 09 engines.

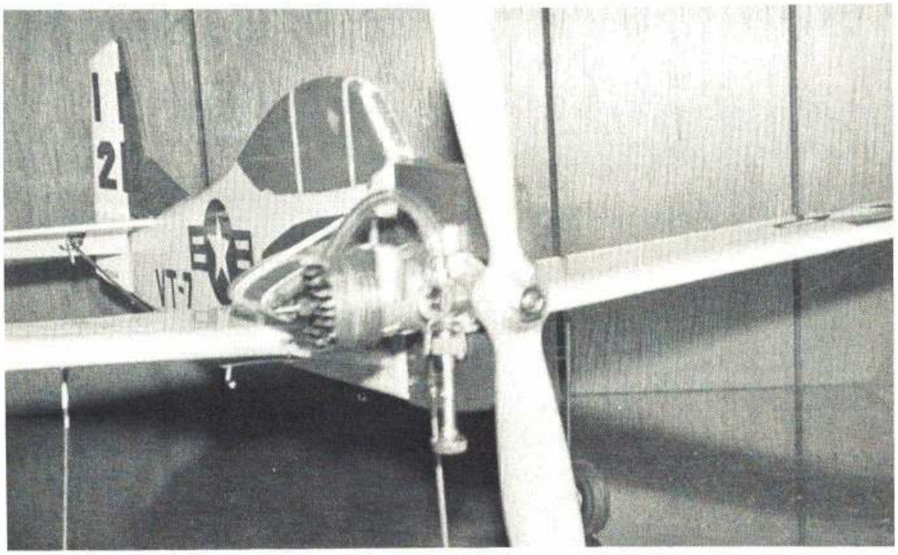
Construction

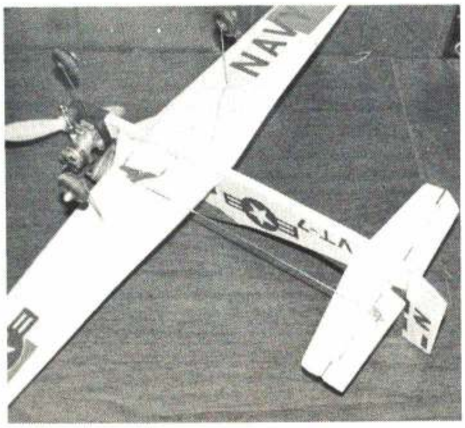
All parts must be traced onto separate paper. This can be accomplished by taping two pieces of typing paper together. The fuselage and fuselage tail section must be traced together by matching up the dotted lines shown on the plans. Be sure to include such details as the wing slot, stabilizer slot and all joint lines. Trace the stabilizer and elevator out. Be sure to include the centerline location. Next, trace out the wing panel which will be flipped over to trace the left wing panel as well. The wing is shown divided into a main section, leading edge section and a trailing edge section. This is so that the main section will fit onto a standard four-in. wide balsa sheet. Be sure to include locations of the landing gear mounts and the bellcrank mount. The bellcrank mount will go on the bottom of the right wing. Trace the rest of the components out. Then, cut all components out so that they can be used as patterns to trace around onto the balsa.

With the wing pattern, trace around it onto 3/8 x 4 x 36" balsa sheet. Use medium hard balsa. Trace out the right wing panel and then flip the pattern over and trace the left wing panel; make sure the centerline is straight.

Cut the wing out and then separate the wing panels down the centerline. Cut out the dihedral slots for the 1/16" plywood doublers. Bevel the edges of the wing roots for a better dihedral joint. Cement the doublers in place and the wing panels together. Block up the

(Continued on page 96)





ABOVE: The business end of the Trojan. Tricycle landing gear makes takeoffs and landings a joy—looks different, too! Slight dihedral angle in wings can be seen here.

LEFT: Study the bellcrank and linkage to get it right the first time. Lead out wires pass through the fuselage, while Z bends keep the pushrod from falling out.

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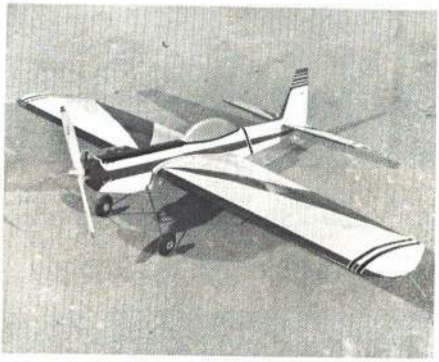
Tern Aero/Super Starduster. Here's a Semi-scale Sport ship designed for a low cost introduction into RC with a single-channel unit. This all-balsa plane has a 34-in. wingspan and features a removeable wing, separating landing gear and a slide in engine mount. For 049 power. $12.95. Tern Aero Co., Inc., P.O. Box 66398, Chicago, Ill. 60666.

Colbert Industries/Arbor Press. For those who need to exert large amounts of pressure, this new press should be just right. The PanaPress can wield 1/4 ton of pressure, making it useful for bending, crimping, punching and many other operations. Ram is fully reversible and angle of operating lever is adjustable. Colbert Industries, 10107 Adella Ave., South Gate, Calif. 90280.

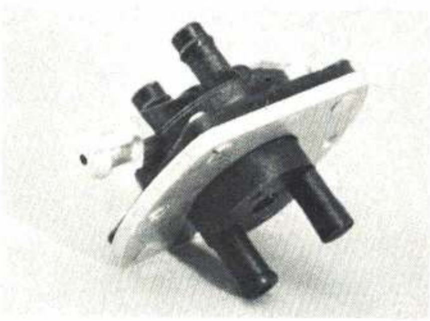
M&P/"Mongoose". Dick Mathis designed this Slow Combat ship to meet current Slow Combat rules, yet the plane is suitable for U-control training or Stunt. Plane has 33½- or optional 36½-in. span with 302- or 339-sq. in. area. Kit has die-cut ribs and selected balsa to keep weight to 20-22 oz. $7.98. M&P/Design Group, P.O. Box 338, Lone Oak, Tex. 75453.

Bridi/RC Sportster. New, semi-scale type low wing trainer is designed for four-channel RC systems and 09 to 35 engines. Kit has typical quality machine-cut balsa parts and hardware is included. Attractive ship has enough area (50-in. span, 410 sq. in.) for a beginner, yet is capable of maneuvers expected from larger models. $34.95. Bridi Hobby Enterprises, 1611 E. Sandison St., Wilmington, Calif. 90744.

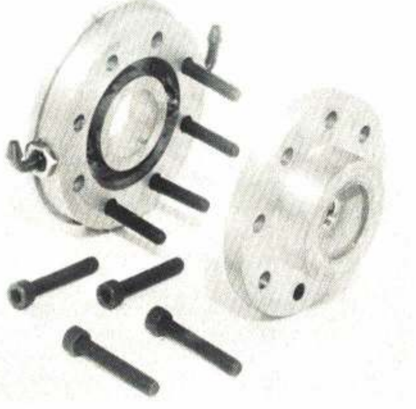


Sig/"Akromaster". Compact CL model is great as a stunt trainer and is capable of flying the entire AMA pattern. All-balsa construction provides light wing loading, stable flight and fast building. Plane measures 34-in. span, and uses 15 to 25 engines. Kit includes shaped parts, hardware, canopy and bent landing gear. $4.95. Sig Manufacturing Co., 401 South Front St., Montezuma, Iowa 50171.

Wall-Lenk/Cordless Iron. This soldering iron features unlimited portability because of its self-contained power pack. The iron has a built-in spotlight for work in those dark areas and the iron heats to over 700°F in about five sec. Approximately 100 joints can be soldered from each charge. A charger is included with the unit for overnight recharging. $19.95. Wall-Lenk Mfg. Co., Inc., Box 3349, Kingston, N.C. 28501.

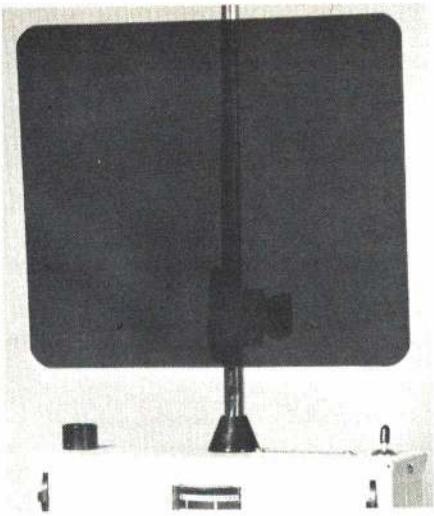


Jenesco/Refueling Device. This handy accessory allows tank filling without having to disconnect any fuel lines. The valve is especially useful to pylon racers as it may be used with pressure systems. It also eliminates the risk of a flooded engine during fueling. $5.95. Jenesco Engineering, 1649-1 Sepulveda Blvd., Torrance, Calif. 80501.

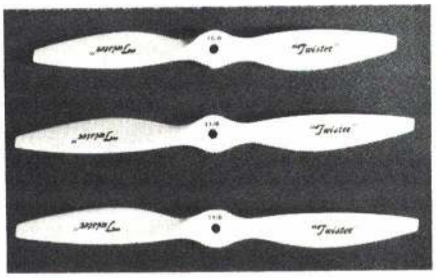


Marine Specialties/New Sizes. These carefully designed and engineered watercooling heads are now available for four more popular boating engines—the K&B Schneurle 40, Taipan 21, OPS 40 and 60 engines. These diecast aluminum heads come complete with water fittings and socket head cap screws. $11.95 each. Marine Specialties, P.O. Box 588, Saratoga, Calif. 95070.

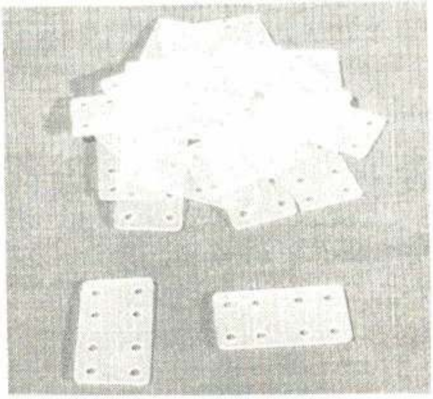
Williams Bros./Boeing 247. First in a series of metal display models is this Boeing 247. The kit is in 1/72 scale and can be built in two versions. It features retractable landing gear, de-icers and controllable pitch propellers. Interior detail, decals, comprehensive instruction sheet, display stand and soft tires are supplied. Excellent for the scale buff. $4.95 Williams Bros., 181 B St., San Marcos, Calif. 90269.



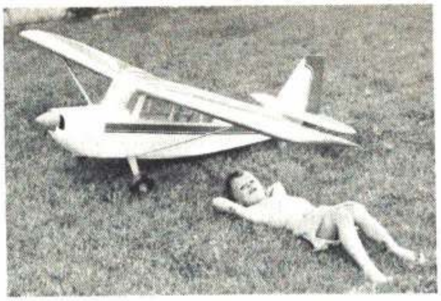
Prather/Sun Shield. A useful and necessary item for modelers with hi-flying planes, this sun shield protects the flier's eyes from the harmful rays of the sun. Shield snaps on transmitter antenna and will not cause image distortions. $2.98. Prather Products, 1660 Ravenna Avenue, Wilmington, Calif. 90744.



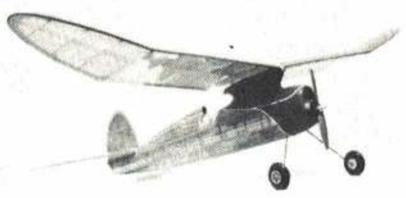
S&S Hobby Products/Twister Props. These fine maple props are now available through S&S. The props use rockhard Eastern maple wood and a thick hub for good performance. They are fuelproof finished for good wear and appearance and are carefully balanced. Three sizes are available—10-6 ($.85), 11-6 ($1), and 11-8 ($1). S&S Hobby Products, 150 Caldwell St., Cloverdale, Calif. 95425.



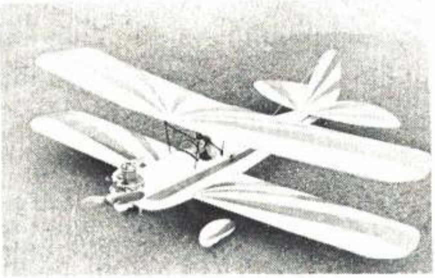
Kraft/Live Hinge. These low cost polypropylene hinges are extremely easy to install and will withstand high vibration, dampen flutter and will not gum up from epoxy or dirt. Hinges have holes for epoxy to slip through for a positive installation. A package of 20 is $.95. Kraft Systems, Inc., 450 West California Ave., Vista, Calif. 92083.



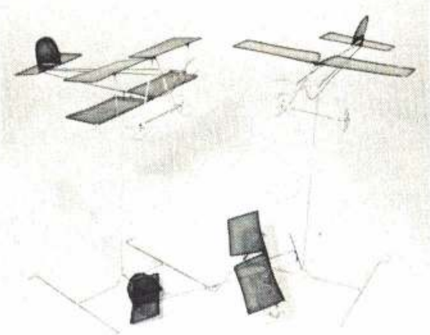
Sureflight/Citabria. Huge, eight-ft. span Stand-off Scale ship features all-balsa construction except for a vacuum-formed cowl. Plane has over 1500 sq. in. of area but, because of light wing loading, will fly on a good 60 to 80 engine. Should have a good scale effect. $125. Sureflight Products, 656 Nome Rd., Valpariso, Ind. 46383.



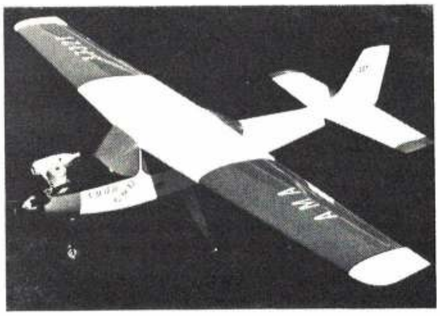
Micro Models/New Ruler. A 31-in. span replica of Henry Struck's famous 1940 New Ruler. The kit features a preformed plastic cowl, machine-cut and printed parts, selected balsa and all materials needed to build a high performance Old-Timer FF Model. For 020 power. $9.95. Micro Models, P.O. Box 1273, Covine, Calif. 91722.



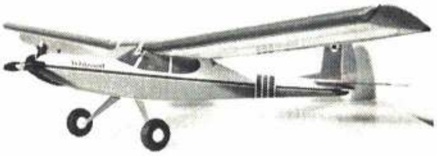
Aero Precision/Sundancer Bipe. An EAA style aerobatic biplane, this attractive ship has a 48-in. wingspan and is for 40 size engines. This size should make it easy to transport and is economical on fuel. The kit features foolproof wing alignment, all-balsa construction, full-size plans plus a package of hardware. $39.95. Aero Precision, Box 152, Tipton, Ind. 46072.



Van Horne/Wire Models. These attractive wire airplanes are suitable for use with trophies or simply for display. Monoplanes and biplanes are available with or without stand in a covered or uncovered surface. Wire is covered with a colored, transparent material, making the airplanes very attractive. Prices range from $5-10. Gene Van Horne, 942 Skyway Blvd., Colorado Springs, Colo. 80906.



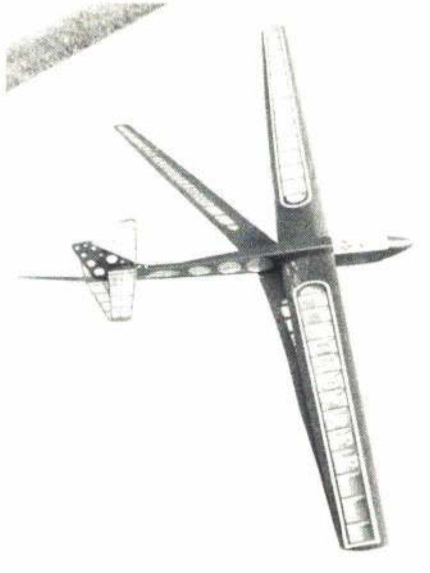
Better Built/Cuda Cub. Fiberglass fuselage makes this easy flying sport ship quick and simple to build. To save more time, wings are foam cores available in a balsa-covered deluxe version. Model has a 64-in. span and has plenty of room inside fuse for easy accessibility. For 40 to 60 engines, plane weighs in at 6½-7 lb. Standard version with all balsa, $64.95. Deluxe, $89.95. Better Built Airplane Products, P.O. Box 163, Camarillo, Calif. 93010.



ACE/Whizard. New sport design from Owen Kampen is for one-, two- or three-channel F.C systems and 049 Babe Bee or Tee Dee engines. Kit has a 40-in. span foam wing for quick building and a balsa fuselage for strength. Kit contains hardware, landing gear. $17.95. ACE RC Inc., 203 W. 19th St., Higginsville, Mo. 64037.

AAM TESTS

WINDFREE GLIDER
BRUCE AND CAROL ZABRANSKY



The Windfree by Mark's Models is a competitive standard class thermal soarer. It is not meant for the novice glider pilot, but rather for the expert or intermediate level glider enthusiast.

Construction of the Windfree is much like that of any other built-up plane. A complete instruction manual is included in the kit.

Following this instruction manual, construction begins with the two wing panels. We spliced 1/16 x 2" balsa sheets to form the leading and trailing edges. Then we added the bottom spars, ribs and top spars. We followed the manufacturer's instructions with regard to the use of specified adhesives. The result is a strong yet light pair of wings. Where strength is a must, we used Titebond and/or epoxy. Where sanding was necessary or where weight is a factor, we used Ambroid (pre-gluing first).

Since the wings plug into rods extending from the fuselage, we were careful to set the brass tubing in the wing panels according to instructions. There is no special or secret way of doing this. You just have to be careful!

While waiting for the glue to dry after completion of some of the wing, we began construction of the fuselage and tail surfaces.

The lightening holes in the fuselage (rear section) sides not only look great but are essential. A good rule of thumb is: An ounce in the tail is worth five in the nose. This is very important when constructing a thermal soarer where added weight is undesirable. Our Windfree weighs 27 oz. ready to fly. That leaves us three oz. for repairs before hitting Mark's prescribed weight of 30 oz.

Since the Windfree was designed for small independent servos, our two-channel brick presented a bit of a problem. This was easily remedied by widening and lengthening the nose of the fuselage slightly, although the same thing can be accomplished by trimming the cross braces in the nose to fit the brick.

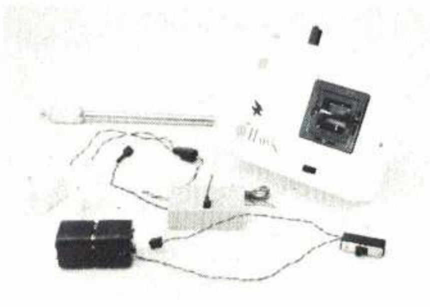
Our Windfree is covered with Plum Crazy and Clear Super MonoKote and trimmed in white. The letters and numbers in the wings are made of lightweight posterboard attached to clear nylon thread sewed in an "X" fashion throughout the ribs with small dabs of five-minute epoxy.

With a covering of MonoKote, it was easy to warp the required 1/8-3/16" of washout in the wings. This is very important—washout gives the Windfree a smooth stall without causing one wing tip to stall before the other.

The Windfree is adept at sniffing out thermals. It will either raise or dip a wing or wiggle its tail to let you know it's found some lift. And when you're tired of thermal soaring, you can loop it or fly it inverted for some real fun!

SPECIFICATIONS: Airfoil: Flat bottom. **Wingspan:** 99.25 in. **Wing Area:** 560 sq. in. **Length:** 41.5 in. **Weight:** 30 oz.

ORBIT HAWK THREE-CHANNEL
DUANE LUNDAHL



Orbit's Hawk Three-Channel Radio has been recently introduced to compete in the low-priced end of the radio spectrum, with application aimed primarily at either sailplanes or rudder/elevator/throttle type powered aircraft. The system used dry batteries for both the transmitter and receiver, thus reducing the initial outlay required. The set retails for $139.95.

Transmitter: The transmitter is housed in an attractive white plastic case which is very compact considering the use of the nine-volt dry battery. The three channels are controlled via a two axis D&R open gimbal stick on the face of the transmitter and a thumb lever throttle control mounted on the side of the transmitter.

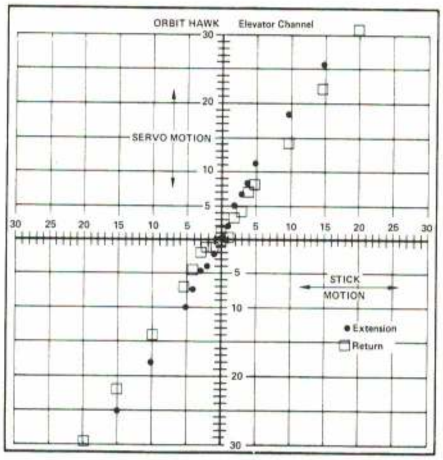
The transmitter uses a center loaded antenna which is mounted at a 45° angle to the plane on the face of the transmitter, thus giving a better orientation to the antenna when the transmitter is held in the normal manner. Another feature of the Hawk radio is the interchanging frequencies manipulated through the use of removable crystals on both the transmitter and receiver. The crystal is housed in a small plastic carrier which is inserted through the top of the transmitter. This changes the frequency. Though Orbit uses the standard method of housing and plugging in the crystal, it seems that there must be a better way since the crystal appears to be rather loose in its holder, and also vulnerable to loss or unintentional removal. I should state that I am not aware of any problems along these lines, but it seems that there is a potential for it.

Receiver: The receiver section of the radio is a standard Orbit design and may be utilized with a six-channel transmitter if the additional leads for servos are added. The receiver section utilizes a double tuned front end and three stages of IF. The crystal may be removed without disassembling the case.

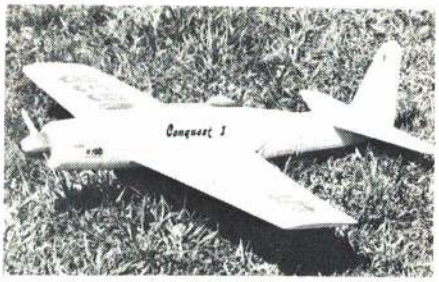
In the case of the receiver, I am not concerned about crystal loss or inadvertent removal since, if you follow directions, you will have the receiver enclosed in foam rubber (thus preventing inadvertent removal).

The decoder utilizes an integrated circuit (an eight bit shift register) which gives the capability for adding channels simply by tapping off each of the subsequent outputs for an additional servo. Orbit has very thoughtfully brought a lead out to the battery connector which connects to the detector of the receiver, thus enabling the service tech-

(Continued on page 96)



RC KITS F-8-F
BOB BROWN



Full-scale Unlimited Air Racing has been dominated for several years by Darryl Greenamyer in his airplane, the Conquest I. The racer is actually an F-8-F Bearcat that has been modified with clipped wings, a huge radial engine, and a redesigned cockpit with a very small bubble canopy. As unique as this aircraft is, it is a wonder that it has taken this long for a modeler to copy it.

The F-8-F model designed by Bill McCala of Lancaster, Ohio, in accordance with the Mentor ¼ Midget rules and also the proposed NMPRA/AMA rules. All of the popular 15 engines can be fitted under the cowl.

A competent builder will have no problem in interpreting the instructions and plans, although they are quite vague. The novice may find it necessary to seek advice while building.

The fuselage construction is quite simple and fast since it is basically a box. Bulkheads are either plywood or balsa and the fuselage sides are one-piece balsa sheet. The plans show the proper placement of the firewall in accordance with the engine being used. The fuselage top is carved from a balsa block. All fillets are made of polyester resin mixed with micro balloons. This method is simple and saves considerable time.

The wing is a foam core covered with 1/16 balsa. The formed maple landing gear blocks are epoxied into the pre-cut slots in the foam core. Landing gear struts are prebent 3/16 piano wire. A hard balsa strip is used for the leading edge. The ailerons are installed at the discretion of the builder. A neat, effective method of aileron installation involves the use of a long torque tube running through the wing. The aileron servo must be inset quite deeply into the wing so the servo will clear the fuselage.

The F-8-F is finished with polyester resin, acrylic lacquer and acrylic enamel. These materials produce a contest-like finish, but the ready-to-fly weight of the plane is only three lb. This weight is within the desired minimum.

The flight characteristics of the Bearcat are typical of most ¼ Midget Racers. The controls are quite sensitive, but not erratic. Takeoffs require a slight amount of rudder and elevator. While this model is not a trainer, it should create no problem for the competent pilot.

The RC Kits F-8-F Bearcat is a uniquely designed model for the serious ¼ Midget Race enthusiast. The kit quality is quite typical in comparison with others on today's market.

Kit Specifications: Wingspan—40 in. **Wing area**—304 sq. in. **Engine**—15. **Weight**—2½-3 lb. **Material**—Balsa fuselage, foam/balsa wing.

CARL GOLDBERG

WHAT EXPERTS SAY ABOUT CG RETRACTS

Jack Stafford: Based on reliability, we made CG Retracts our standard installation.

Dave Brown: 125 gals. of fuel and the gear has given **no trouble of any kind.**

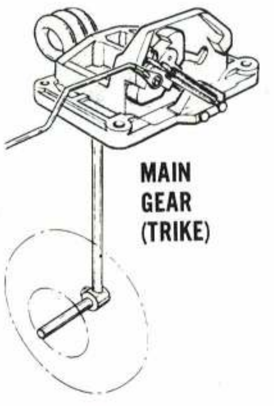
Jim Grier: In 7 months of flying, your gear has never failed.

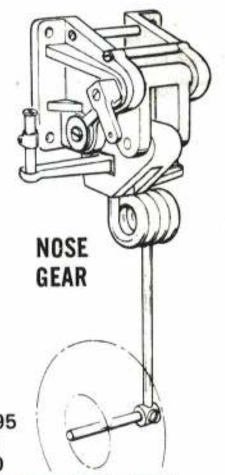
Walt Moucha: CG Retracts work like a fine watch—(and) can take hard use.

Jim Oddino: Your gear gives high performance at low cost — a rare achievement.

Bill Thomas: One ship has used 30 gals. of fuel, without landing gear malfunctions.

Bud Atkinson: 429 flights with Goldberg Retracts — and they'll easily go another 400.



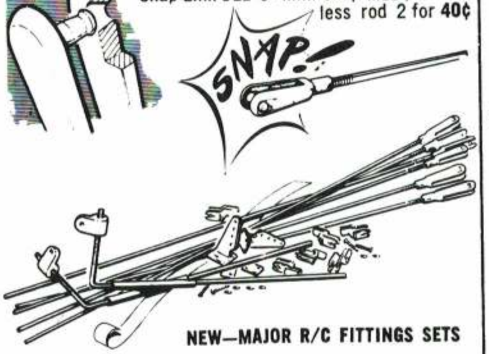


TWIN GEAR Retracts–RG2–$14.95
TRI-GEAR Retracts–RG3–$24.95
NOSE GEAR (Only)–RG1–$10.00

UNIQUE SNAP-LINK! Patent 3711134. Now for the first time—you can buy a truly safe link—the SNAP-Link!

- Tiny 45° shoulder snaps through arm. prevents accidental opening. So unique it's Patented !
- One-piece design—no separate pieces that might come apart.

Snap-Link, Regular, with rod	SL1	29¢ ea
Mini-Snap-Link, with rod	MS1	
Snap-Link SL2 or Mini-Snap MS2, less rod		2 for **40¢**



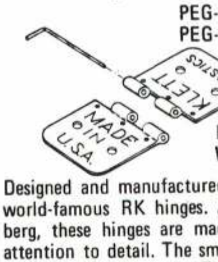
NEW—MAJOR R/C FITTINGS SETS

Here's the economical way to buy the major fittings for your multi-ship. In one set, you get all the horns, links, keepers, bellcranks, or strip aileron linkage, and hinge material—and at a saving.
R/C Fittings Set No. 1 for ship with standard ailerons. RFS1 **$3.50**
R/C Fittings Set No. 2 for ship with strip ailerons. RFS2 **$3.50**

NEW! KLETT PUSHROD EXIT GUIDES

To protect your fuselage and insure smooth operation of your pushrods. Precision made of tough nylon. Easy installation. Large for 5/64″ wire, small for 1/16″ wire.

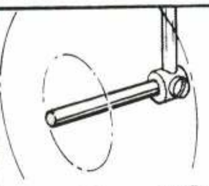
PEG-1 LARGE 4 per pkg. **75¢**
PEG-2 SMALL 4 per pkg. **75¢**



KLETT HINGES – WORLD'S FINEST!

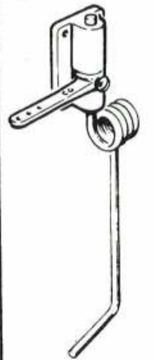
Designed and manufactured by Roy Klett, originator of world-famous RK hinges. An exclusive with Carl Goldberg, these hinges are made with exceptional care and attention to detail. The small RK2 hinges are so thin all you need is a knife slit. The regular size RK3 hinges are the slickest you've ever seen – try holding one leaf and waving the other! And both have **removable music wire** pins. Ask your dealer for the best – Klett hinges.

RK2-7	7 for **$1.10**	RK2-15	15 for **$1.95**
RK3-7	7 for **$1.25**	RK3-15	15 for **$2.35**



5/32″ ADJUSTABLE AXLE

Adjustable axle allows you to easily have the strut length you want. Both the axle and screw are hardened steel. Just file a flat on the strut, and tighten axle in place. AA1 **75¢** ea.



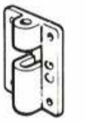
STEERABLE NOSE GEAR

Versatile — steering arm can be to either side, or slightly up or down, or mounted on bottom with extra collar in slot. Steering arm is nylon, stiff enough for good control, yet can flex under shock to protect servo. Collar is hardened steel — won't strip like brass. Screw is hardened steel, too. You can really torque it and get good grip on music wire strut without a flat.

Complete steerable nose gear with nylon bearing, 5/32″ plated music wire strut, extra collar, blind nuts, screws and washers G16N **$2.50.**

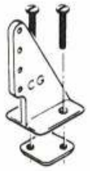
NYLON STEERING ARM

Hardened steel collar and screw SA1 **75¢.**



NYLON BEARING

One-piece design. mounts to firewall without alignment problems. Includes blind nuts, screws and washers NB1 **75¢.**

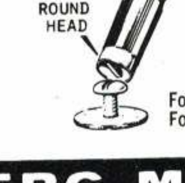


CONTROL HORNS

Our new horns have the upright part rising from the center of the base for maximum stability. Holes are right size for 1/16″ wire; nut plate for simplest mounting. Long horns CH1 or short horns CH2 , with screws—**50¢**/2.

NYLON REINFORCING TAPE

This nylon reinforcing tape is extremely tough when applied with epoxy around the center when joining wing halves. 2½″ wide x 5 ft.— N2 **50¢.** ¾″ wide x 5 ft. N1 **25¢.**

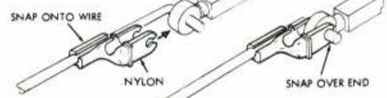


NEW KLETT SAFETY DRIVER SOCKETS DOWN ONTO SCREW HEAD — CAN'T SLIP OFF AND DAMAGE YOUR WING!

Takes Round Head Screws and Binder Head.

KLETT SAFETY DRIVER

For ¼″ Nylon Screws	SD1	98¢ ea
For #10 Nylon Screws	SD2	

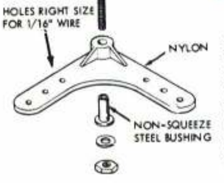


SNAP'R KEEPER

Quickest, handiest way to secure pushrod wire end to servos, horns, etc. Works on wire 3/64 to 5/64″ diameter. SK1 **50¢** for 4.

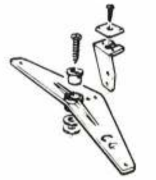
REPLACEMENT FOAM WINGS, ETC.

To go with your own design fuselage. Proven efficient Ranger 42 foam wing gets you in the air quickly — **$3.95.** Stab and vertical fin, set **$1.95.** Assembled Ranger 42 fuselage. plus bearers, nosegear, etc., **$9.95.**



AILERON BELLCRANK

Bellcrank has steel bushing of proper size, so crank can be screwed firmly in place without binding. No electrical noise—all metal parts are screwed tightly together— AB1 **50¢** for 2.



½A BELLCRANK and HORN

Made of nylon, this new set provides smooth ½A control line operation. Easy on dacron lines, too BCH1 **25¢.**

SHEET METAL SCREWS

Like wood screws, but better. Sharp, clean, full-depth threads, hard and strong. Excellent for mounting servos, etc. Includes washers—#2 x 5/16 SMS2 **30¢** for 10; #4 x 3/8 SMS4 **30¢** for 8.

P.S. For best service, see your dealer for items you want. If not available, write direct; add 50¢ per item ($1 outside U.S.). Minimum order $1.

MANUFACTURERS—All our accessories are available at excellent O.E.M. bulk prices.

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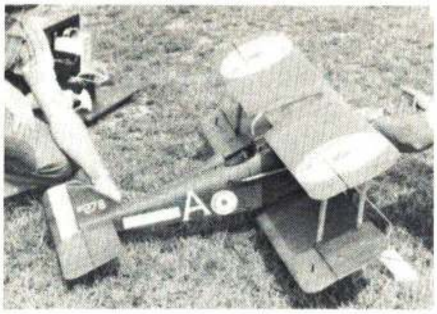
TOP FLITE S.E. 5a

MAYNARD JUBERT



The boxy look of the S.E. 5a has always appealed to me even though frankly it is quite ugly. However, its sound design and planform made it an outstanding WWI plane. These inherent characteristics have been aptly engineered into a 53-in. version by Top Flite.

Top Flite came out with the model a few years ago, but my limited scale flying deterred me from building the kit then. Resistance is limited and here I am writing about the finished product.

I have built several Top Flite models from the Taurus to the present P-40. The same qualities that have always made these kits popular are retained in this one. The selected balsa, ply and hardwoods are of high quality and the diecutting is sharp.

The plans are clear, concise and employ something novel—a coat of wax which tends to resist glue adhesion. The plans are not obscured by instructions needed to build such a plane since a 16-page manual is included. The instruction manual is complete and leaves no room for error if followed. Difficult stages such as cabane strut alignment are explicitly described and illustrated. Assembly is sequenced in a logical manner so building can proceed without lost time for drying of subassemblies.

An ingenious attachment of cabane and interplane struts to wings was developed for the kit. It consists of nylon ball-and-socket joints, eliminating much of the super accuracy and fitting usually associated at these points. Wings can subsequently be removed; simply pry apart with a screwdriver. The nylon plates can be dyed with Rit colors to match your color scheme and provide an anchor point for the rigging tabs. The kit is supplied with solid rigging wire for attachment at the tabs by means of special "Z" bends for quick, functional rigging. I chose to use Proctor clevises, twinbuckles and cable at these points for added realism.

Installation of radio equipment presents no problem since there is lots of room for all types of servos and pushrods.

The wing airfoil is scale and consequently very thin. Covering of such surfaces can cause a lot of grief if you use highly shrinkable fabrics such as the rayon-silk blends. I wanted to preserve the appearance of a woven fabric and chose regular Coverite because it has an iron-on adhesive, shrinks easily and requires very little dope. Covering the undercambered wings presented no problems with this versatile material. Rib tapes can be cut and ironed on for that added realism.

After covering and doping, decide how much detail can be added before basic painting. Check scale views and photos and proceed until your patience runs out.

A reliable engine at all power ranges is essential with a plane of this type. I used a well broken-in ST 60 with a Perry carb and it seemed to provide adequate power.

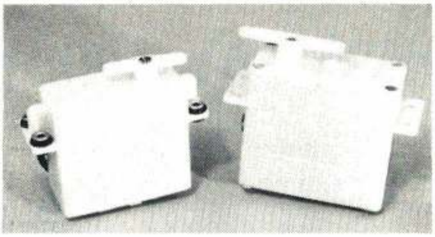
I solved the problem of exhausting the engine by using a Tatone EM-3 manifold and running the exhaust tube to the rear of the tank compartment and downward. The plastic tubing that comes with the manifold can be boiled and bent to provide the 90° bend required. It is then run out through a hole in the bottom of the nose section just ahead of the wing mount. This method prevents any oil from messing up the detailing along the top and sides.

On the subject of detail, I was surprised at how durable the numerous little pipes, brackets, panels, etc., proved to be. They were actually screwed or bolted in place with miniature bolts and have remained in tact de-

(Continued on page 96)

WORLD ENGINES SERVOS

FRED MARKS



World Engines has introduced two new servos since we reviewed their Blue Max MK II IC system. The S-5a is a 180° servo designed for retract gear operation. The S-9 is a minaturized servo designed to be competitively sized with the Kraft FPS-12, Orbit PS-6, D&R Bantam and other small servos. The standard servo for World Engines sets apparently continues to be the S-5.

S-9: The S-9 is a new, small servo that measures 2-1/16 in. long (including the mounting lugs) by 1-9/16 in. (including output arm) by 3/4 in. wide. Small size achieved by using a I6mm Furuichi motor, new servo-mechanism. Uses Delrin plastic gears, 5/64 in. thick for output gear, 3/64 in. thick nearer motor. Case is three-piece. Wires protrude from bottom of case. Adjust centering by loosening screws on feedback pot and rotating. Uses World Engines/Signetics IC servo amplifier.

Performance: Very quick servo, about 0.4 sec. transit time end-to-end. Produces 1.5 lb. thrust at 9/32 in. radius for 0.42 in.-lb. torque. Resolution shown in figure below. Nonlinearity about neutral comes from backlash in gear train that amounted to about 2° on our test sample. Basically a very small, light, quick servo.

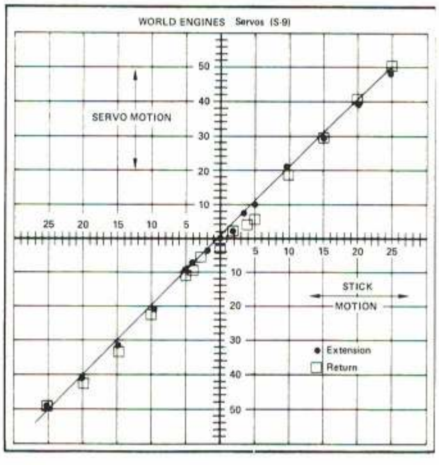
Criticisms are lack of grommet at wire exit, rather low torque, and amount of backlash in gear train. In addition, the motor on our test sample was not properly restrained by insertion into mounting shoulder, thus it is restrained only by clamping action of case bottom and wires from servo amplifier.

S-5a: The S-5a is a modification to the S-5 mechanism to increase the overall gear ratio, and to provide much more torque and heavier gears for use with retractable landing gear. Uses the same basic amplifier as S-5, World Engines/Signetics IC amplifier, but feedback potentiometer is paralleled by a trim pot to adjust throw to 180° when used on normal, unswitched channel.

A 20mm Furuichi motor is used. Mechanism is 2-3/16 in. long including mount lugs by 1-3/4 high including crossbar type output arm, by 7/8 in. wide.

Performance: Developed 4-1/4 lb. thrust at 13/32 in. radius for 1.7 in.-lb. torque. Transit time is 3.2 sec.

Criticism: Gears began to ratchet at 1.7 in.-lb. torque. This prevents servo from reaching full potential torque at stall. Conversation with World Engines indicates that rotation of gears to different position might overcome this.



ROYAL PRODUCTS FW 190A

DON BOTTERON

When I learned that Royal Products of Denver, Colorado, was releasing a scale kit of the classic Focke-Wulf 190A series, I knew my winter was shot. For sheer brute power and functional but awkward grace, this beautiful beast has long been one of my favorites.

This imported Japanese kit lives up to the reputation established by the preceding Royal scale line. The parts are machine cut, identified and packaged in logical construction sequence. The hardware package is extensive and of excellent quality. The wood is highest grade and straight although of a slightly heavier stock than I would normally select.

The plans are adequate but do not match the excellence of the rest of the kit either in reproduction or comprehensiveness. Fortunately, they are augmented by an excellent step-by-step instruction booklet written by Jim Simpson. If instructions are followed, a reasonably experienced modeler will have no trouble assembling this fine kit.

While somewhat complex, construction of the basic airframe is well engineered. The wing is egg-crate type construction with a full-length, full-depth plywood spar with adequate room for retracts in front of the spar. The fuselage is constructed in two sub-assemblies with some care required to assure proper alignment.

A couple of general tips are in order—keep that tail assembly LIGHT. With the short scale nose moment, there is not enough lead in the world to balance a heavy tail on this beast. Also, the plastic used in the canopy is extremely susceptible to heat and will soften if left for long periods in direct sunlight; so keep something white over it at the field.

My particular Focke-Wulf was patterned after the A-3 series and (through no fault of the kit) was extremely heavy—9 lb. plus. It was finished with Hobbypoxy using the new flat hardeners and had retracts, flaps, servo operated canopy and a closed exhaust system plus airborne batteries for the glow plug. (Now you know why 9 lb. plus.)

At this weight and after six months' construction time, the nerves were working overtime on test flight day. After cranking up old faithful—a well broken-in and reliable Webra Blackhead—I taxied out and pointed that stubby nose into the wind. I eased the throttle open. The tail lifted after about ten ft. and 50 ft. later, it broke ground in a completely level attitude and climbed out dead true. No trim adjustments were needed. This bird flew just like the fighter it was supposed to be. But don't fall asleep on the stick! It will snap if you get too slow or try to turn too short at low speeds; it's that 9 lb. again, so keep the speed up. The plane is fully aerobatic. Those two-point landings look so good they make you hurt.

A week after it made the test flight, the Wulf easily won Scale at the Lincoln Sky Knights' annual bash topping both flying and static judging. That's the best recommendation I can give you.

Specifications: Length—1310mm or 50½ in. **Wingspan**—1530mm or 60¼ in. **Design weight**—3.2-3.5kg or 7-8 lb. **Engine**—10cc or 61 cid. **Scale**—1¾ in. = 1 ft.

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The BA-607 monolithic IC has 73 transistors, 13 diodes and 79 resistors —a total of 165 parts.

The BA-606 monolithic IC has 2 PNP and 2 NPN type high output (500 mA) transistors, 4 diodes and 4 resistors—a total of 12 parts.

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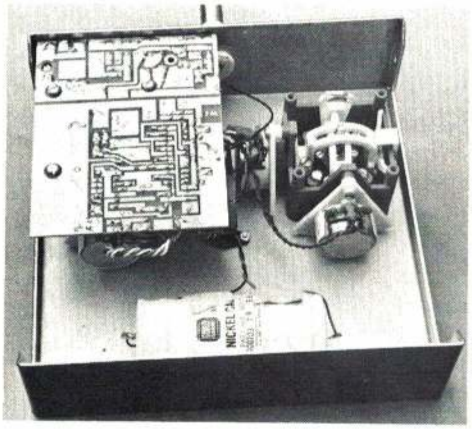
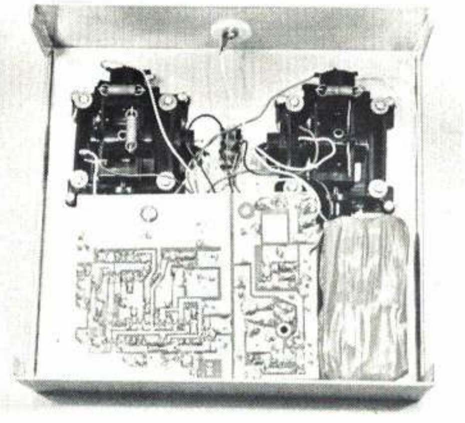
AAM 3-4 Channel Transmitter Conversion

/ by Fred Marks

(Left) Much used four-channel with Rand sticks. (Center) Four-channel with two D&R open gimbal sticks. (Right) Conversion to single-stick configuration.



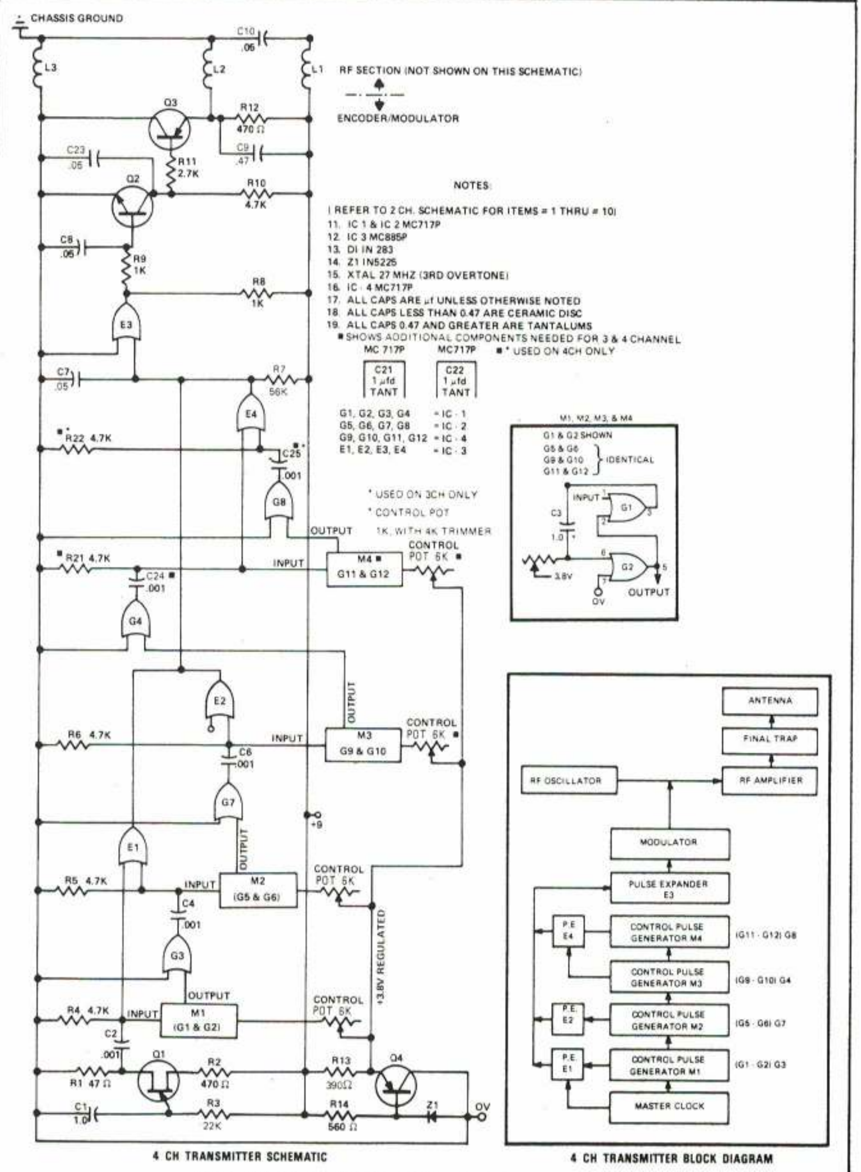
A new box with antenna mount and second Rand stick.



Four-channel transmitter with D&R sticks. Use of ACE 450 mah packs and mounting p.c. board on standoffs permits case to be thinned to about 1½ in. if desired.

In May 1972, **AAM** presented the transmitter for a two-channel system that was the AAM Commander. At that time, we promised the 1-8 channel receiver-decoder presented in June 1973 **AAM**, the 3-4 channel transmitter conversion and the digital P.O.D. This article presents the steps needed to convert that original two-channel transmitter to three or four channels. One can, of course, build the complete three- or four-channel transmitter from scratch from the instructions provided here and in the May 1972 **AAM**.

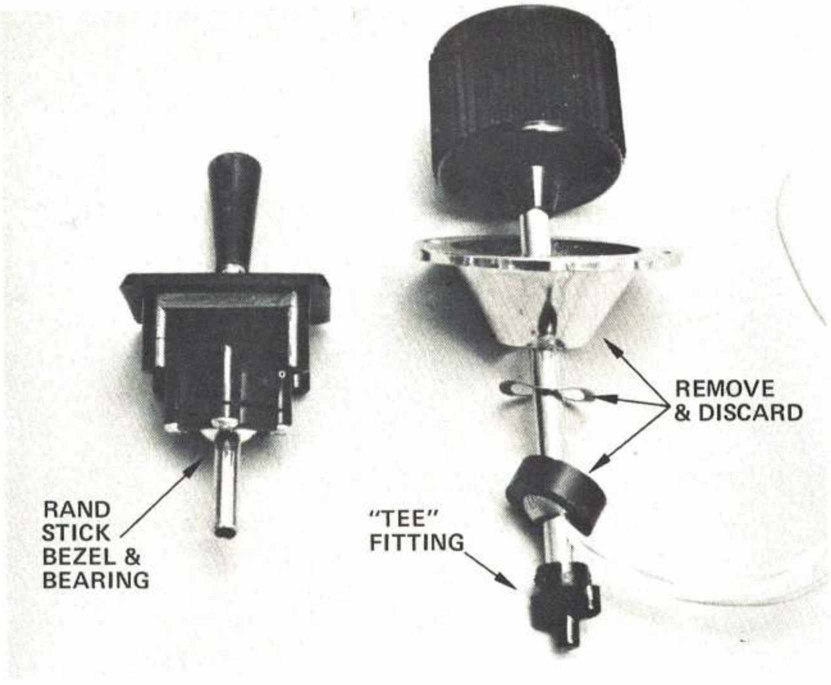
Electronically, the conversion is a simple matter of adding two more stages of control pulse generation. The basic functions are precisely the same as for the two-channel set. Review the material in the May 1972 issue and remember that we have added two new timed control pulses, T4 and T5, to the operating block diagram, Fig. 1. Just five components are added for three channels, and eight components for four channels. IC-4 is added for either three or four channels. A timing capacitor (1.0 microfarads) and the differentiator



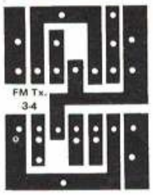
4 CH TRANSMITTER SCHEMATIC

4 CH TRANSMITTER BLOCK DIAGRAM

FIG. 1 SCHEMATIC AND BLOCK DIAGRAM



To convert Rand stick to single-stick operation, start with old Rand shaft and bearing, new single-stick shaft (Orbit shown). Remove bezel, spring and outer bearing.



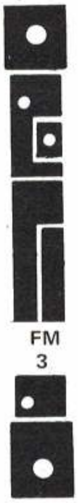


FIG. 2: Add-on board (above) accepts IC and timing capacitor. Terminal strip board (right) is for use with slider pot to get third channel—as seen in upper left corner of single stick Tx. Negatives of both borads are available through AAM Plans Service.

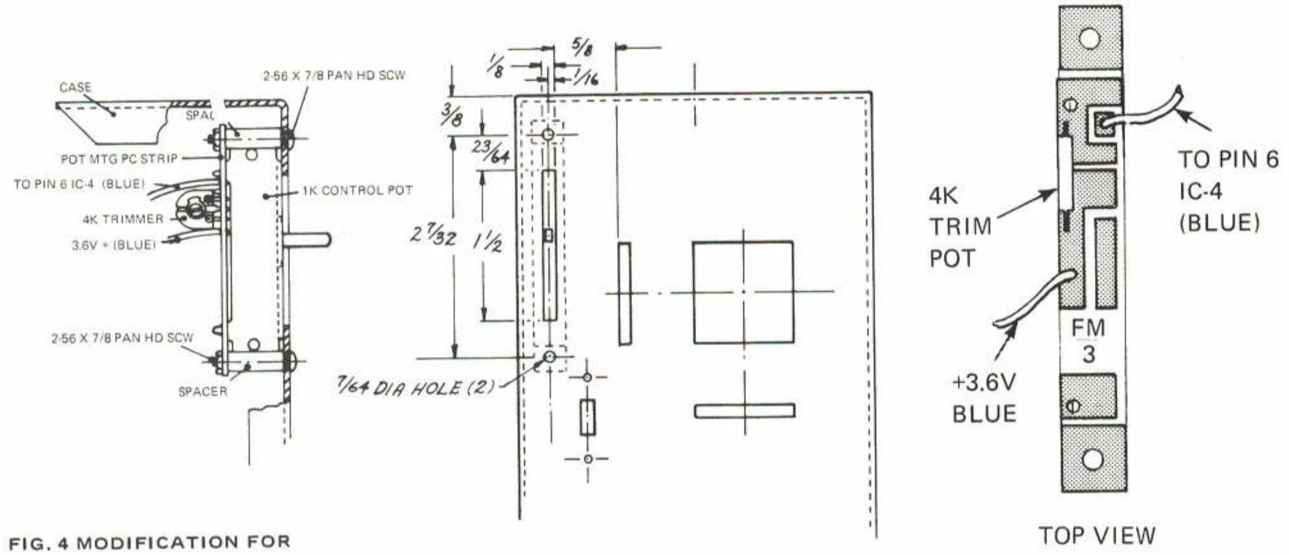
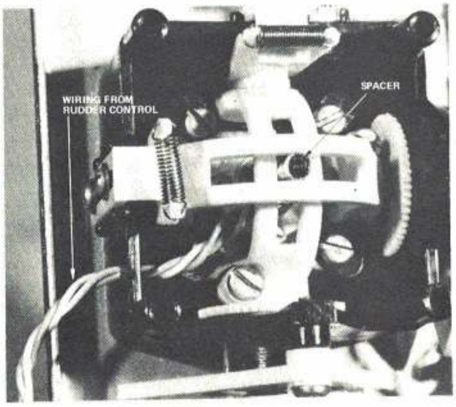


FIG. 4 MODIFICATION FOR 3 CHANNEL CONVERSION



Step 5—Shaft and bearing reassembled to the bails and stick body.

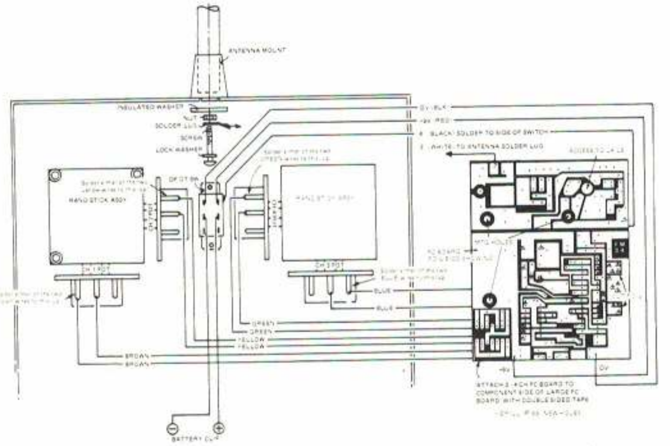


FIG. 6 WIRING DIAGRAM FOR 4 CHANNEL TRANSMITTER (USING RAND STICKS)

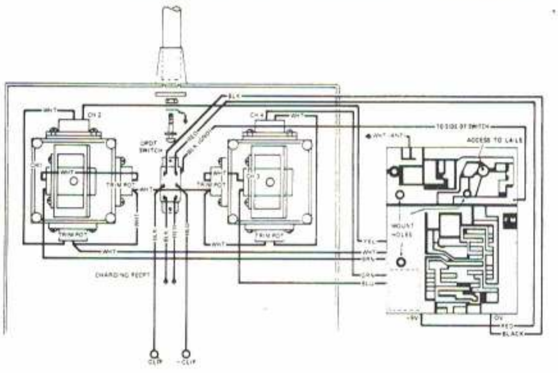


FIG. 7 (D&R) 2 STICK CONFIGURATION (4 CHANNEL)

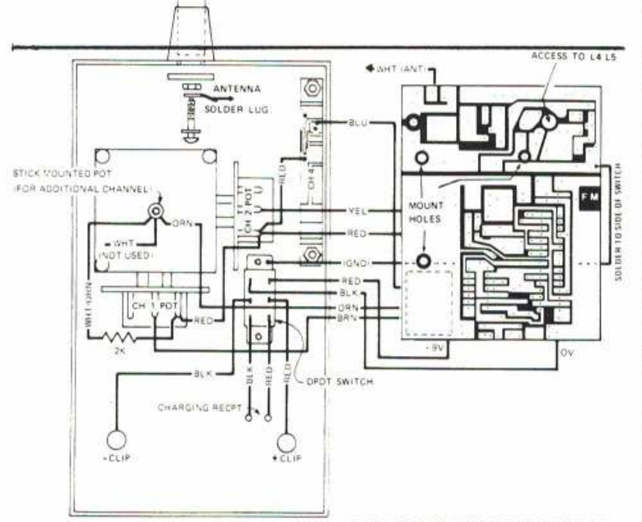


FIG. 5 (RAND) SINGLE STICK CONFIGURATION (4 CHANNEL)

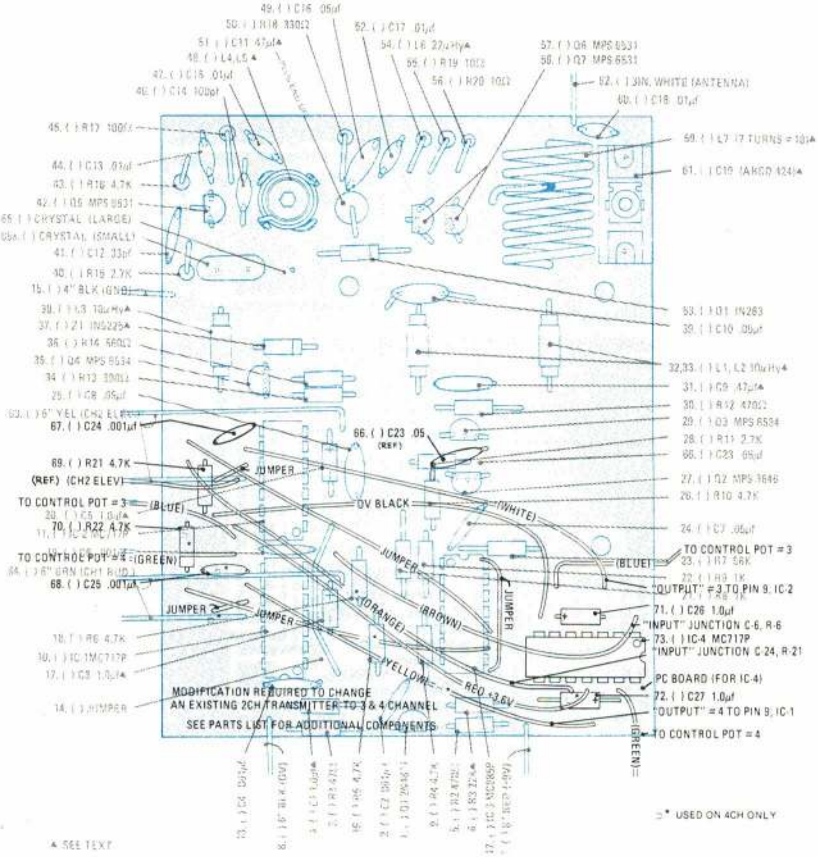


FIG. 3 TRANSMITTER OVERLAY

(.001 microfarad and 4.7K resistor) plus control pot must be added for each channel.

Making the Transmitter Board Conversion—Fig. 2 presents the positive for a conversion add-on board that accepts IC-4 and the timing capacitor and acts as the terminal board for add-on wiring. Fig. 2 also presents a p.c. board for a terminal strip for use on the slider pot for a third channel. Make printed circuit boards as described in the first of the two-channel articles (April 1972 **AAM**).

Next, study the original transmitter p.c. board, the overlay (Fig. 3) and hookup diagram (Fig. 5) to see where two small squares are to be cut in the old p.c. copper foil for the new differentiator components. (We will present the instructions for four channels; one need only delete those fourth channels components unnecessary for three channels.) Drill the added holes for components identified in Fig. 3 as 66-70, plus the holes needed for connecting wires. Item 66 (C-23) has been added to the modulator to lengthen the modulation pulses slightly.

Mount IC-4, C-26, and C-27 to the add-on board and add the connecting wires (yellow, green, red, black, blue, white, orange and brown) to the add-on board. The length of the wires for control pots will depend on the particular mechanical arrangement you choose, so make them six in. long for now and trim as needed later. This completes the add-on board which should now contain three components and eight connecting wires. Scrub the printed side of the board with thinner and trim the solder joints evenly to within 1/16" from the board.

Add the jumpers and items 66-70 to the transmitter board as shown in Fig. 3. Attach the add-on board to the transmitter board using servo mount tape. Dress the connecting wires neatly to the transmitter board, cut to length, strip the ends 1/8" and tin. Solder to the locations identified in Fig. 3. This completes the transmitter board conversion. In addition to the original power, antenna, ground and control pot wires, there should now be two new control pot wires (blue and green) hanging from the board. While we used separate wires from the +3.6 volt "buss" (see refer-

(Continued on page 101)

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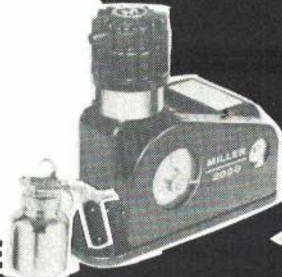

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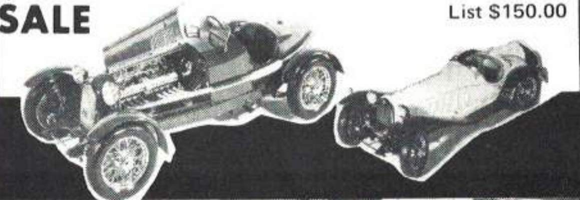

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JOHN BURKAM ON HELICOPTERS

New U.S. Record?: On October 20, 1973, Square Tubie flew for 59 min. 40 sec. in a world Duration record attempt. Since the present record is one hr. 12 min. 23 sec., no one passed out cigars. Will the AMA recognize RC Helicopter Duration? After all, it recognizes indoor and outdoor records of free flight "so-called" helicopters! At an average fuel consumption rate of 17½ oz. per hour, the three lb. ten oz. of fuel carried would have lasted 3½ hr. if a bearing on the intermediate shaft hadn't failed and disengaged the tail rotor drive gears.

The model, Square Tubie, introduced to readers of this column in 1972, has a five ft. rotor turned by a K&B 40 engine through a timing belt reduction of 16:1. Empty weight, including the Kraft radio, with 1000 mah batteries, two 27-oz. plastic bottles and mounting hardware and plumbing was seven lb. six oz. The two bottles were slightly higher than the ten oz. main tank so that gravity feed was used. The chicken feeder principal prevented overfilling the main tank. An air outlet near the top of the main tank led to the top of both bottles. A line from the bottom of each bottle went to near the bottom of the main tank. The one open vent tube on the main tank extended inside to nearly the bottom of the tank. In this way, the outlet from the main tank to engine was always at exactly atmospheric pressure. When the level of the main tank fell below the air bleed to the bottles, air went to the bottles and allowed more fuel to go to the main tank. Gravity also kept fuel at the same level in both bottles.

The pilot was holding out well at the end of the hour, but his left arm was getting stiff from holding the single stick transmitter. Either an arm sling or a transmitter shoulder strap will be used on the next attempt. A 10-20 mph wind was blowing so that the model was sometimes flying in an updraft from the nearby hill. At one point, that lift failed so suddenly that altitude was reduced to a couple of feet before recovering. Most of the time, the model hovered into the wind at 50-150 ft. altitude.

Other easy-to-beat world records for RC helicopters are closed course distance, 15 kilometers (9.33 mi.); straight line distance 6043 *feet*; speed 0; altitude, 649.5 ft. That last one may require optical aid because choppers have very little visible area.

The only restrictions on RC helicopters for world records are: Max gross weight, five kg. (11.023 lb.); engine not over 10 cc. (.61 cu. in.); rotor area not over 300 dm (32.28 sq. ft.); no lifting wing(s); and horizontal stabilizer area not over 1.5% of rotor disk area.

Model Helicopter Research: While practicing for the record attempt, experiments were made in changes in flap spring constant and horizontal stabilizer area. The original, rather loose flap spring, comparable to that on the Du-Bro Hughes 300, made hovering rather difficult although forward flight was easy. For improved hovering, the spring stiffness was approximately doubled and a new Kraft radio with faster servos was installed. These two changes made hovering much easier, but something happened to forward flight. After more observations, it was found that the difference occured, when in forward flight, the throttle was reduced in order to lose altitude. Then the tail dropped and full forward stick was required to prevent a mild stall turn.

Next, the flap spring was loosened up, giving the blade tips about two in. total free play before encountering the flap springs. Big improvement in handling. Only a small amount of forward stick was required to maintain forward speed when throttling back.

Then the horizontal stab area was increased from 0.7% of rotor area to 1.1%. The airfoil was Clark Y type with flat side down and at zero incidence with respect to the rotor. Still more improvement in handling. All these tests had the aircraft CG about 3/4" ahead of the rotor shaft and the model hovered with swashplate perpendicular to shaft.

Next, the leading edge of the stab was raised about 0.1 in. Once the model got into a rather steep (45°) spiral dive at a high altitude. During the pullout, one blade struck the tailboom, the rotor stopped, and the model started falling. However, the rotor came up to speed again, the folded blade straightened out on its single bolt attachment, and flying was resumed! After a hasty but gentle landing, the tailboom was found to have a 5° bend, and one blade trailing edge and tip were damaged. After this, the softer flap spring was re-installed, with no free play, and the stab was re-set to zero incidence for tne record attempt.

The rotor with stiffest flap spring and no free play behaved somewhat like a hingeless rotor. That configuration will be tried again with an even larger 1½% stab as a prelude to building a genuine four-bladed hingeless rotor.

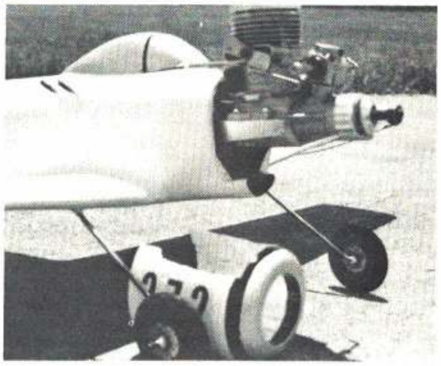
How fast does your helicopter really fly? Square Tubie's speed was measured recently using a simple system borrowed from the rubber-powered speed boys. Station a man with stopwatch at each end of a measured 200-ft. course. Fly the chopper through the course straight and level; each timer starts his watch as the model crosses the line which he is watching. Timers walk to a mid-point and stop their watches simultaneously. Difference between the two watches' readings is the time to fly the course. Then fly the model in the other direction and time it again to average out wind velocity effect. Square Tubie averaged 32 mph on the second pair of runs without very much of an acceleration run before each flight.

Good Rod Ends At Last!: The best model rod ends I have seen for the money are those made by Harold Everson, 224 N. Rankin St., Appleton, Wisc. 54911, for $1.25 each. Free turning, yet almost no play. A 3/32 hole in the stainless steel ball; No. 2-56 tapped hole in the aluminum shank.

Model Rod Ends by Harold Everson are a bargain.

Rossi 60-powered Guardian by Gene Wielms of St. Louis. Note release for tailhook and rubber band to pull down hook.

Engine compartment and mount of Gene Wielms' (St. Louis) ST 40-powered Carried model. Cowl removed.



Grumman Guardian is prepped by Jim Womack of Salt Lake City, Utah. Note hook and flaps.

JOHN BLUM ON NAVY CARRIER

Build From Scratch: Perhaps we assume that modelers understand all of the published material. The reader, however, is confronted with the problem of understanding, either through experience or with help. To completely overcome this is impossible, but perhaps we can help build the reader's skill. The basic aim is to encourage more participation in Carrier through the ability to read drawings and to build more models from scratch.

Reading Drawings: It is not the object to create draftsmen here, but to enhance the art of "blueprint reading." Once this is done, the added possibility of a modeler making field sketches and then interpreting the material at the bench will enhance the whole project. In this manner he can understand and talk the language. Now, let's get down to business.

The first step in "reading" a drawing is to understand what the lines mean. These lines have a name and description. Borderline is a bold, wide line around the border of a drawing to give it a "framed" appearance. Construction line is a line never seen on a published drawing since it is used to layout the object and is not needed for reading. Also, published drawings are ink tracings which do not include the subject line(s). However, the very light, thin construction line may be noticeable on an original drawing and one should be able to identify it easily. This line is used to establish reference points, centers, proportions, basic shapes, etc.

Object line is a bold, dark line which is used to outline the shape of the major objects such as fuselage, wing, tail, wheel, etc. Centerline is used to identify the exact center of any object such as center of the crankshaft, center of the spinner, center of the fuselage, etc. It is one type of broken line represented by a long dash, short dash, long dash and is repeated as often as necessary. The center of a mounting hole showing the circumference would be represented by two three-part centerlines of long dash, short dash, long dash, one at 90° to the other, with the short dashes crossing each other at the center of the hole. Hidden line is represented by short dashes and depicts objects such as engine, tank, pushrods, etc., that are fully enclosed or are not in true view of the eye in the view depicted. In a true sense, it is another form of object line. The dimension line is a thin, but distinct line used to locate the extremities or point of an object to which to give dimension(s). This type is not always used on published plans since subject plans can usually be purchased in full-size.

That is the basic group of drawing lines and should be fully understood. Refer to recent issues of **AAM** for construction drawings and try your hand at identifying these. Next month we'll describe several more and offer illustrations. After several sessions ofthistype, we'll try to put it all together.

Photo by George Siposs

A MAN FOR THE RECORD. George Siposs claimed a land speed record of 53.03 mph with this three-ft. long model. The car's 13 lb. weight was motivated by a McCoy 40.

BOB STALICK ON FREE FLIGHT, INDOOR, RUBBER, POWER

Indoor Modeling: The season is upon us to get ready to bang the rafters of the local gymnasium or auditorium. Of the many events that are a thrill to see, one of the most spectacular is Indoor Rubber-Powered Duration. A good glimpse of this can be seen in the British film, "Wings and Things," available from the AMA for a nominal rental fee. To really experience the feeling, however, build one yourself. Two of the easiest of the indoor model types to build are the EZB and the Pennyplane. And the most important component of either of these is the propeller. This month, we will concentrate on building a suitable prop.

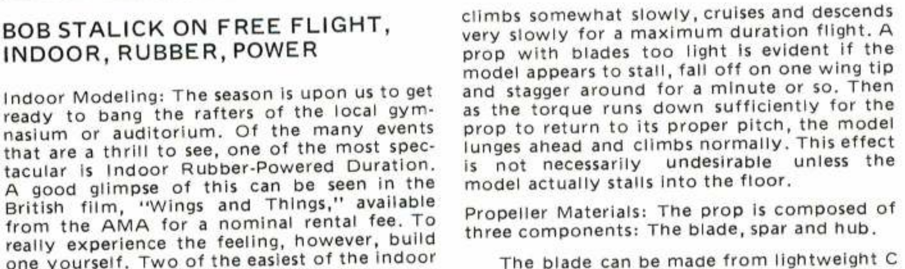
First off, the flexibility, and the consequent lightness of the prop, should be matched to the overall model weight. For example, a prop with 1/100 in. thick blades should only be used on very light models, not over 1/25 oz. Heavier models should use heavier props of 1/64 to 1/32 in. thick. The shape of the prop is such that under maximum winds (torque), the blades will deflect to a higher pitch setting causing the prop to turn slower, conserving winds.

As the power runs down, the prop gradually returns to a lower pitch setting allowing the rpm to remain somewhat constant. The overall effect is that the thrust to time ratio does not drastically change, and the model climbs somewhat slowly, cruises and descends very slowly for a maximum duration flight. A prop with blades too light is evident if the model appears to stall, fall off on one wing tip and stagger around for a minute or so. Then as the torque runs down sufficiently for the prop to return to its proper pitch, the model lunges ahead and climbs normally. This effect is not necessarily undesirable unless the model actually stalls into the floor.

Propeller Materials: The prop is composed of three components: The blade, spar and hub.

The blade can be made from lightweight C grain balsa of a thickness to match the model as stated previously. If you use either a 1/100 or 1/64 in. thickness, do not sand. Sanding weakens the wood fibers and allows excessive blade deflection. The spar should be B grain, medium balsa approximately 1/16 in. square at the center tapering to approximately 1/64 in. at the tip.

The hub is the portion which attaches and aligns the blades and the wire at the proper angle. Beginners can use a short length of aluminum tubing (1/16 in. inside dia. x 5/8 in. long) as this allows the flier to twist the blades and experiment with variations in pitch angle. There is, however, a slight weight penalty associated with the aluminum tube and the more advanced flier should use a short piece of 1/16 sq. balsa to which the blades are permanently attached—at the proper pitch.



Construction: The following method has been found to be simple and effective. (Other methods are detailed in the 1964-1965 Zaic Yearbook.)

Blades: First, glue the flat blade to the tapered spar using thinned Ambroid Glue sparingly and avoid a glue fillet as this warps the blade. After it is completely dry, soak the blades in hot water for about two min. and attach to a four-in. dia. can (a one-lb. coffee tin will do) using soft rubber bands. Attach the blade so the prop centerline is approximately 20° behind the can's centerline.

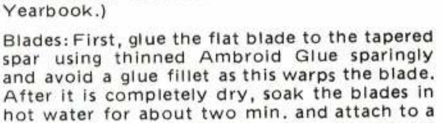
Hub: Glue the wire, either .012 or .015, to the 1/16 balsa or aluminum tube using epoxy cement. Cement the wire securely so that it will not twist out under maximum torque.

Assembly: Assembly of the blades to the hub at the proper angle is somewhat critical. As an aid, use a simple jig made from plywood which holds the wire shaft in a vertical position while the blades are epoxied to the balsa hub. A typical jig would have a 45° support located at a radius of 3.8 in. from the center, which produces a 24 in. pitch.

A final operation is to add a small teflon washer and trim any excess wood from the hub and spar to save weight.

(The above article from *The Hawks Newsletter* by Jim Walters.)

Indoor Rubber Duration is the word this month. Dennis Jaecks shows off his Pennyplane which won the NATS Penny Plane event in 1971 with a flight of 11 min. 21 sec.



NEBULA

(Continued from page 31)

over the completed fuselage, using plastic wrap as protection for the aircraft. The fiberglass extends to the bottom edge of the wing root fairings. The engine mount is cut from 1/4" plywood and fiberglassed to the pod base. It is held on by the two 3/16" wing mounting rods.

We have gone into quite a bit of detail on the following building instructions to make the work as clear as possible.

Construction

FUSELAGE: Laminate plywood nose doublers and balsa tail doublers to sides. (We recommend epoxy.) Cut and glue down all triangle stock as per plans, cutting triangle stock to step over doublers. Use formers as gauge for proper spacing. Add a plywood stab pivot reinforcement. Glue the two main bulkheads to one side; when dry, glue the other side to bulkheads, making sure the sides are parallel. Pull sides together and glue to front bulkhead. At the rear, glue the sides to 3/16" sq. balsa tail post. Add nose block, forward top block, 1/4" balsa nose section bottom, 1/8" plywood bottom piece. Add top block and 1/8" sheet top covering. Before enclosing the tail, drill hole for 1/8" ID brass tubing bellcrank pivot. Make tail bellcrank from pattern on the plans out of 1/16" thick sheet nylon or epoxyboard. Cut slots for stab linkage by putting pivot tube in place with bellcrank on outside of fuselage. Move up and down and mark radius for slots. Install bellcrank by epoxying the brass tube pivot into fuselage. Install the stab and rudder nyrod. Glue on remainder of the fuselage sheeting. The fuselage shaping really makes the project. Go heavy on the sandpaper and really round off the corners, exposing about 3/16" of the triangle stock. The wing root fairings and wing mounting tubes will be added later.

Make up canopy floor ends, using fuselage as the base. After drying, sand to shape slightly smaller than opening to allow for thickness of canopy. Install canopy latching dowel as per plans, gluing securely to canopy base front. Glue a square of scrap balsa near both sides of rear canopy base to keep it from shifting sideways. Two small wires hooks, one glued to base and one glued midway down interior fuselage side, with a rubber band between act as a catch. A section of the floor can be cut open to allow room for radio equipment if you have a larger radio. Apply your favorite finish and any cockpit details to canopy base. Cut the ends from the canopy and tape it in place over fuselage. Use masking tape to outline correct shape and trim the canopy. Glue it to base with contact cement or other suitable glue. Trim tape can be used to cover the cement. If you use an electronic thermal indicator, it should fit just behind the servos. Hollow top block and cut bulkhead enough to allow its

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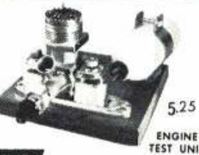

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installation. For the variable camber/flap installation, the removable canopy section is extended enough to allow access to the flap servo. The large Midwest control horn can be used or one can be fabricated from 3/32" music wire and brass tubing.

RUDDER: Working on flat surface over wax paper, epoxy the three sections of rudder together. Allow to cure and sand off excess glue. Sand rudder to streamlined shape. Cut slots for hinges in rudder and fuselage per plans. Attach hinges with epoxy after finishing.

SURFACE SHEETING: To butt join balsa sheets, trim edges of sheeting with X-acto knife or razor blade and straightedge so seam will meet as closely as possible. Lay sheeting to be joined on FLAT SURFACE edge to edge and run masking tape over the length of the seam. The sheet is then turned over and held underneath so that the seam opens up and slow-cure epoxy is run down the length. Lay the sheet on flat surface. Scrape and wipe away any excess glue that has squeezed out. Weight should be used to keep sheeting flat until dry. Then sand smooth with sandpaper block. Using this method, make four sheets of 36 x 10". Each sheet is assembled from one 4 x 36" piece and one 6 x 36" piece. These are the root panel wing skins. Make four sheets, 18 x 9" from one 6 x 18" piece and one 3 x 18" piece. These are the tip panel wing skins. For the stab skins, use four sheets 18 x 6". All sheeting is 1/16" balsa.

STABILIZER: Cut grooves into the foam cores to permit installation of the brass tubing mounts. The front tubes are 1/16 ID, the rear tubes are 1/8" ID. From the full-size section on plans, cut the wedge shape balsa pieces to size and epoxy them to the two-in. long brass tubes. Epoxy these assemblies into foam, using the 1/8" and 1/16" wire joiners to align the halves. Check to be sure you have the correct dihedral. Sand away any excess balsa flush with the foam cores. Be sure that the distance between the tubes lines up with the holes in the bellcrank control. Assemble the stab halves to the fuselage and bevel the root ends to fit closely against the fuselage sides. Lightly sand off any imperfections. To retain the stab halves, put a small kink at the ends of the 1/16" wire so it is a force-fit into the tubes.

To skin the cores, we recommend Southern's Sorghum Cement or any hobby product sold for this use. It is always better to try a new cement on a piece of scrap foam so as not to risk melting the foam cores. Apply cement to 1/16" balsa sheeting and bottom of foam core as per manufacturers' instructions. Place balsa skin on FLAT SURFACE and tape down edges if necessary to make skin lie flat. Carefully align core over skin and lay core down starting with trailing edge. Press core down firmly but do not mar the foam. Remove core from table and trim away ex-

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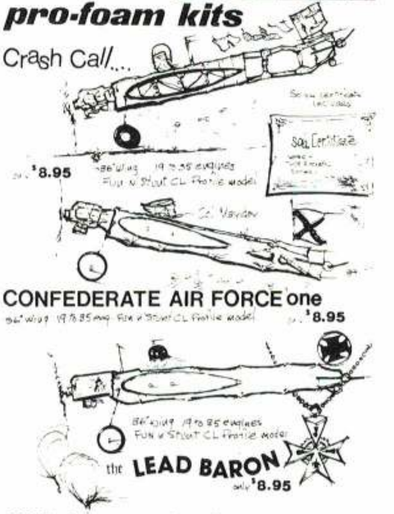
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cess balsa from leading edge, root and tip. Using a straightedge, trim sheeting at trailing edge 3/16" away from foam to allow for bevelled joint with top skin. (See typical stab section on plans.) Place stab, skin down, with trailing edge on edge of table. With sanding block, bevel balsa to conform with curve of airfoil. Apply cement to cores' top surface and top stab skin. Place skin on table; temporarily pin or tape down if necessary. Align core over skin. Press trailing edge of core on skin. Remove tape or pins and roll core toward leading edge. Remove excess balsa, use straightedge to trim stab trailing edge even with bottom skin. Repeat with other stab half. Add leading edges, root caps and tip caps.

WINGS: Spars with their brass tubing and plywood "sandwiches" are assembled first. Working over plans, trim root ends of balsa spars to allow for insertion of 3/16" ID brass tubing. Epoxy 1/16" plywood doubler to one side of spar. Epoxy brass tubing and balsa wedge trimmed from spar as per plans. Epoxy on other plywood doubler to complete sandwich. Repeat with other spars. Epoxy spar assemblies into the foam cores on a flat surface. Do NOT join tip spar to main spar now. Sand away any excess wood flush with the cores. Skin the root and tip panels following method detailed for the stabs. Add and shape leading edges. Join the root and tip panels with epoxy on stub spar and edge of cores. Then use a one-in. wide light fiberglass or nylon cloth and epoxy over the joint. Squeeze off excess epoxy to make the joint less visible. If polyhedral is desired, the wing may be cut and reinforced with fiberglass and epoxy.

Bevel wing roots so they will butt against fuselage wing root fairings. In center of root, midway between tubes, insert small 1/8" plywood square, level with surface of foam. Glue with epoxy. Drill 3/16" holes in plywood root caps to align with brass tubing in cores. Coat 3/16" music wires with a thin film of vaseline; insert into tubes in one wing panel. Using wires as guides, epoxy root caps to core. Repeat with other panel. Laminate balsa and plywood tip plates. Epoxy tip plates to wing tip and round off balsa.

WING MOUNTING (CRITICAL): Drill two holes in balsa wing mount fairings to match the ends of the finished wings. Locate the two fairings on the fuselage by measuring from plans. Temporarily pin or tape them in place. When you are sure they are correctly located, use them as guides to drill the four holes into the fuselage for the 3/16" ID wing mounting tubes. Insert the tubes, the 3/16" mounting wires, and slide the wings in place. Check to make sure the wing is square with the tail, incidence the same on both sides, etc. If necessary, enlarge the holes in fuselage and shim them as required to line everything up. Then epoxy tubes in place. Place wing mount wires, lightly coated with vaseline, through fuselage; thread on

Dear Joe:

I was a Pattern Judge at the 1971 Nationals and the 1972 Nationals; also Pattern Judge at the Masters Tournament in 1972. Throughout these events and at all the other local contests I have judged and attended, I have seen the Kaos winning and placing. I have flown both the stock Kaos and the Super Kaos in competition myself and have had great success with them:

1971, 1st in "A" Pattern competition in Las Vegas, Nevada; 1972, 1st in "A" Pattern, San Jose Wavemasters contest, San Jose, California; 1972, 1st in "A" Pattern, Fresno Open Contest, Fresno, California; 1972, 1st in "A" Pattern, Cal-Hawaii Fun Fly, Honolulu, Hawaii; also Trophy for Single High Score, Class A, Honolulu, Hawaii; 1973, 3rd in "B" Pattern, West Coast Invitational, Woodland, California; 1973, 2nd in "B" Pattern, Fresno Open Contest, Fresno, California.

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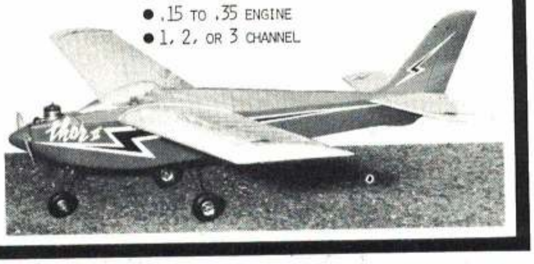

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wing mount fairings, then wing panels. Before sliding wings in all the way, coat fuselage sides of fairings with epoxy. Slide wings and fairings to fuselage. Keep the fairings against wing root and allow epoxy to set. Remove wings and wires. Fill any gaps between fuselage and fairings with epoxy. Fillet around fairing with epoxolite, DAP, microballoons, etc. Sand to blend with fuselage. Drill and file a slot about 1/4" high x 1/2" wide centered between wing mount tubes for the rubber band joiner.

After the first few Nebulas (Nebulae? Ed.) were flying, we decided to try a version with positionable wing flaps. Our first thought was to use them as a spot landing assist, but it was also obvious that drooping them slightly should give us the benefits of an under-cambered airfoil. We have seen other sailplane fliers at various meets using flaps; the benefits seemed worthwhile. We also wanted to try positioning the flaps upward, with the expectation that they would have an effect similar to spoilers, and so would serve two purposes—variable camber airfoil and spoilers.

To construct the flaps, first build the complete wing and then cut out a 2-1/8" wide section along the trailing edge, 36 in. out from the root. Use polyhedral as shown on the plans. Cap the rear of the wing section with 1/8" balsa, cut 1/2" off the front of the flap, and add 3/8" balsa to the flap section. The 3/8" balsa is planed and block sanded to the crosssection shown on the plans to allow more down than up movement.

A control-line type of horn is made up for the fuselage from 1/8" wire. The horn is made in two pieces so it can be inserted into the fuselage from each side and is joined in the middle by soldering each piece into a section of 5/32" brass tubing. Prior to soldering, a short piece of 5/32" tubing is epoxied in each fuselage side to act as bearings, and a Carl Goldberg nylon nose-wheel steering arm

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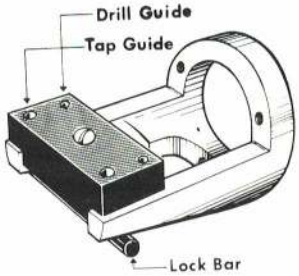

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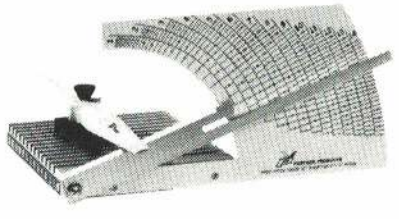

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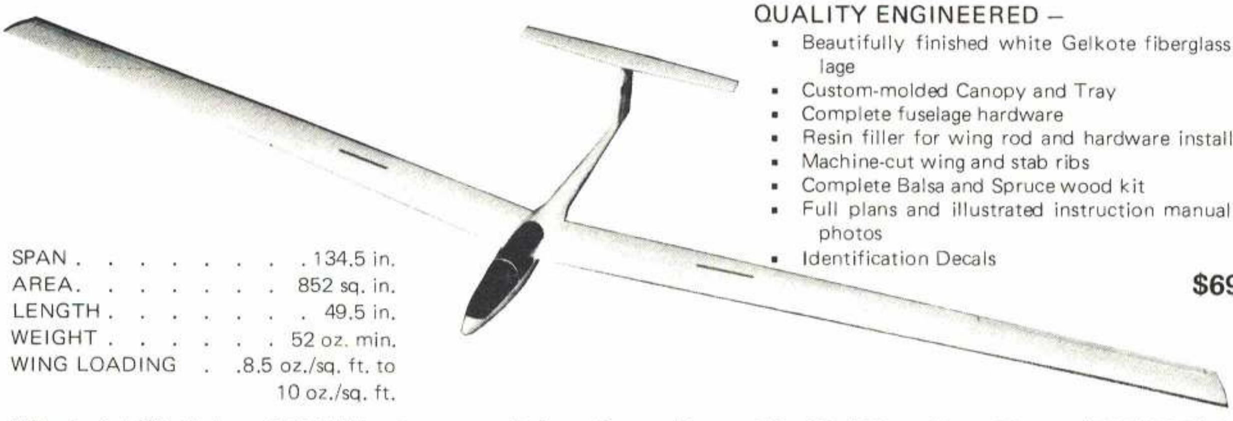

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was positioned over the horn. The nylon steering arm set screw enables it to be tightened onto the 5/32" tubing joiner. Position it as shown on the plans to give differential throw; more down travel than up travel.

To couple the horn output arms to the flaps, it is necessary to have a universal type connection. Fabricate two "joiners" from 5/32" tubing and a short piece of 1/16" wire soldered together as shown on the plans. A piece of 3/32" tubing is epoxied into the root end of each flap to receive the joiner.

A third servo is installed in the fuselage and a pushrod made to connect with the flap actuating horn. Adjust the lenth and throw for approximately 1/2" up movement and one-in. down movement, measured at the flap trailing edge.

For flying, we used the throttle stick to activate the flaps. Neutral flap position was about 2/3 toward high throttle; high throttle gave up flaps, or spoilers, and moving to low throttle dropped the flaps.

Winch launches were made with neutral or slightly down flaps; searching for thermals was done the same way. Too much down flap cannot be used even in thermals as too much drag results. Up flap really increases penetration and speed of the model. Full down flap helps greatly for on-the-spot landings. Trim changes due to flap position can be compensated for with elevator trim.

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FINISHING: We suggest using Solarfilm or MonoKote on wing and tail surfaces and painting the fuselage. Pry open two small screw eyes to form hooks and screw them into the wing roots midway between holes. The wings are held on by a rubber band between the screw eyes. Feed the rubber band through the hole in the fuselage with a wire hook. The interior of the nose section may be fiberglassed or covered with Celastic for additional radio protection. A nose skid may be made from a six-in. length of servo tape covered with a 6 x 1/2" piece of shim brass of living hinge material. A small round-head screw works well as a tail skid. A towhook may be formed from coat hanger wire and fastened with sheet metal screws as per plans. With radio installed, add lead weight as necessary to make assembled plane balance between 3½-4 in. from leading edge measured next to fuselage. The lead may then be epoxied into a hole cut in bottom of nose block. Neutral position of stab may be roughly set by placing fuselage on flat surface before adding skids, and setting stab parallel with surface.

Flying

Flying the Nebula is where the fun starts. Our testing was done using one of Ray Smith's hi-starts—we used 80 ft. of the heavy shock cord and about 500 ft. of 125-lb. test line. A longer setup would be better, but we have gotten good flights with this one.

Start with the balance point as shown on the plans—the balance point may be changed to suit your own flying style. We want it as far back as possible without making the flying unstable. The flying stabilizer seems to be much better than the separate stab/elevator for trimming the plane; up trim can slow the plane down for thermal hunting, and down trim will really speed it up for penetrating on a windy day. Hand launching is no problem for initial tests; just be sure to throw it level or slightly down.

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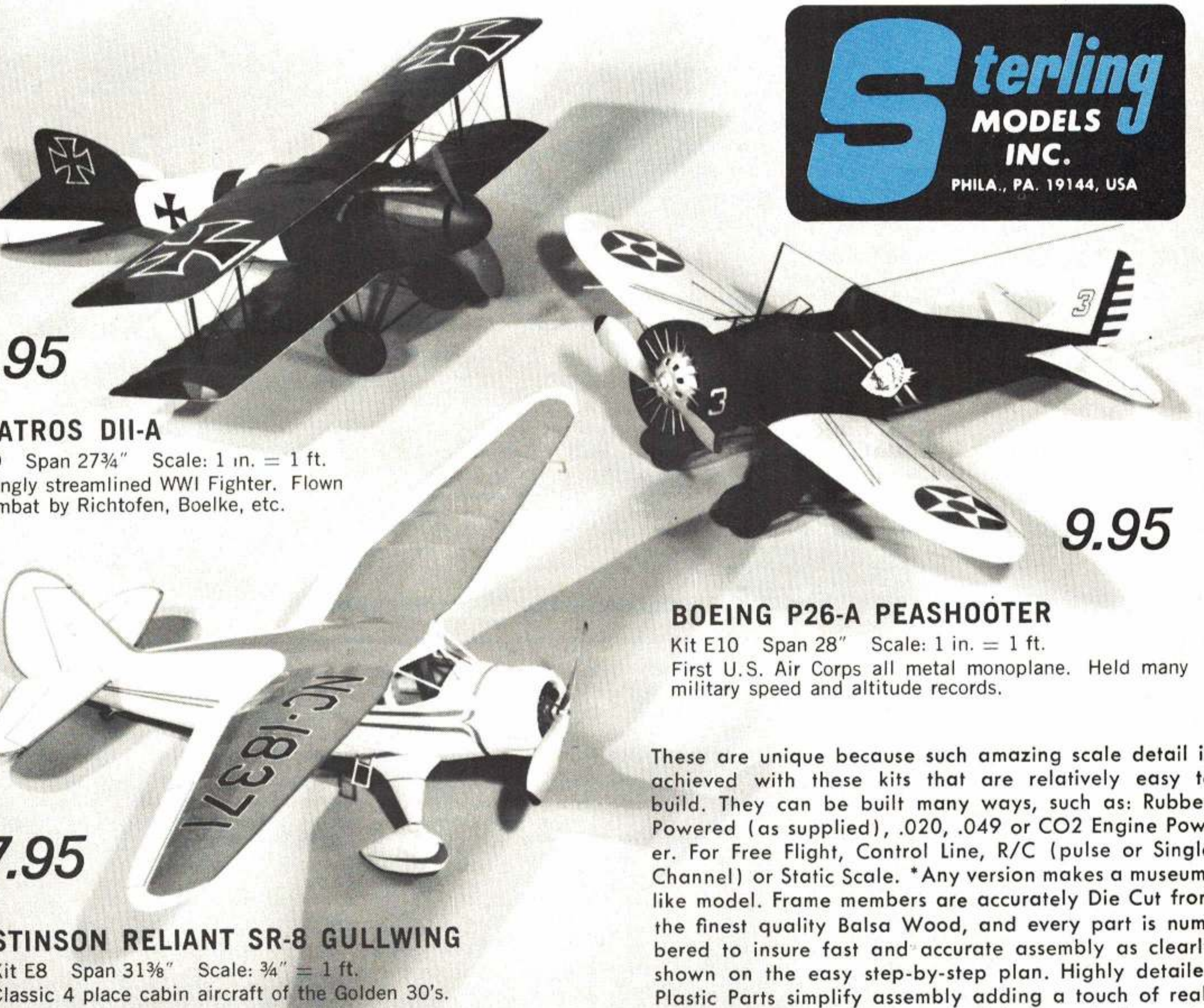

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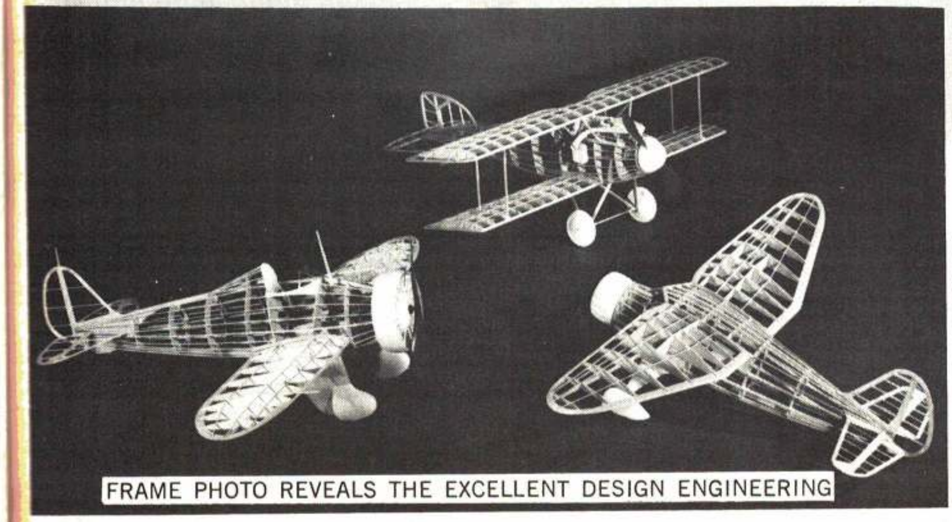

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The towhook location can be varied to suit your preference; be careful not to get it too far to the rear—a stall when launching can be a very bad occurrence.

As with any large plane, be careful with landings. Don't turn too close to the ground—that big wing can go down a long way.

All our flying has been done with the latest Royal Classic radio equipment, which has worked perfectly. Flying a nine-ft. sailplane to an altitude where it appears as a mere speck in the sky is a real test for the RC system—our Royal equipment obviously has plenty of range.

We would like to recommend to all sailplane enthusiasts that you join the East Coast Soaring Society, no matter where you live. The monthly newsletter is well worth the cost of membership.

For anyone who would like to purchase a vacuum formed canopy for the Nebula, or a set of foam cores for the wing and stab, you can write us at 32 Alameda Ct., Shrewsbury, N.J. 07701.

200 MPH VW?

(Continued from page 55)

lot of attention. Young John Monnett's Sonerai had a cantilever folding wing with a thicker airfoil, but otherwise resembled Steve's Vee in general arrangement. Monnett was eager to get the class going, and so immediately began selling plans with enthusiasm—and considerable success. Wittman preferred to hold back until he was 100 percent satisfied with the design, though a few pushy friends were able to badger him into releasing some drawings so they could begin building their own.

The months dragged on, however, and still there wasn't a sign of a race, mainly because there were just the two Formula Vee airplanes—and what kind of a race can you have with two planes? Dozens were being built, but race organizers want some kind of assurance that at least a half dozen will show up, before they'll agree to put up prize money.

Lacking races for his airplane, Wittman continued to do what he could to stimulate interest in the new class by flying airshows and by showing the folks what his machine will do—such as fly it across the Rocky Mountains to Reno in 1972 to see the Air Races. In classic Wittman style, he simply climbed in and took off. While crossing the highest mountains short of the Pacific Coast, he climbed as high as 16,000 ft. and reported the airplane handled "just fine" up there.

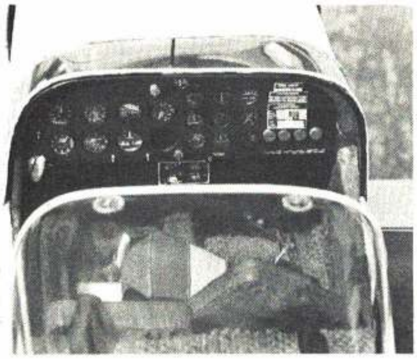
Each time a few more thousand people see Steve Wittman and his neat little VW racer perform, a couple more think seriously about building their own. He has now sold several dozen sets of plans, while Monnett must have topped the 100 mark. By the summer of 1974, a half dozen or more should be flying, and the first race in the history of Formula Vee could be upon us.

In fact, the Great Miami Air Races, scheduled for January 18-20, 1974, has tentatively included a Formula Vee in its program. It may come off, and then again it may not. But each step brings Formula Vee closer to reality. And if the exact date of the first race is far from certain, one thing can be counted on: Steve Wittman will be the odds-on favorite to win that first race, wherever it is.

There's a very good reason for that "No. 1" on the side of Witt's V.

BOSS ON CL

(Continued from page 42)



Instrument panel in Ralph Burnstine's (Danville, Ill.) Thorpe Experimental Aircraft is just one example of the high caliber of work seen in many of the scale models at this year's NATS.

completed up to a maximum of ten laps. The remaining six options are to be chosen by the

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entrant and listed with the judges prior to each flight. Choice of the six options should be made very carefully as there are three operations that count for two options and are worth a maximum of 20 points each. The 20 point options are: Touch and Go, Taxi Lap and Retracting Landing Gear.

Well, there you are: A new event, balanced equally between static judging and flight, and with a broad range of aerobatic and operational options to choose from. Just about any type of plane can be competitive.

Now that the event has been established, let's see it used at contests. And how about sending in some photos and reports of the action. We would all like to know how successful this new event is going to be. Send data to Bill Boss c/o AAM.

Presentation of Scale Detail: What is a Scale model airplane builder? If you stop to think of all that a Scale modeler does while building a scale plane, he begins to take on many identities. He is a carpenter, machinist, designer, artist, writer and photographer.

He's a carpenter because of his woodworking ability; a machinist and designer because of all the gadgets he makes for landing gear, revolving turrets, cockpit detail and all that is required for operational features. He becomes an artist during the finishing stages. And lastly, he is a photographer and writer when preparing the data required to substantiate the scale aspects of this model. The photographer-writer aspect of scale modeling is our concern in this article.

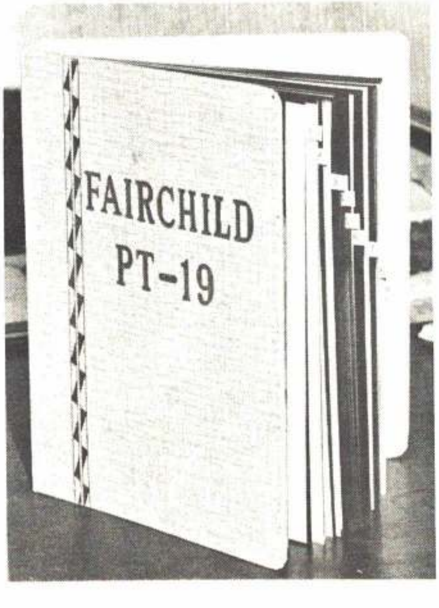
Presenting data to substantiate the scale aspects of a model can be difficult. Present AMA Flying Scale rules indicate that a contestant must provide three-view drawings, with dimensions, to qualify his model for Fidelity to Scale judging. In addition, the contestant may submit a presentation for his model that contains drawings, photos, finish, color and marking data, and written description. This presentation can be worth as much as 50 points in overall scoring.

The exhibit need not be complicated or overly elaborate. Too much data is just as bad as not having enough. You may deluge the judge with so much data that it is almost impossible for him to find what he needs; or you can give him so little data (three-views only) that he can not score properly. The idea is to strike a happy medium—provide the necessary data in a concise, straightforward manner.

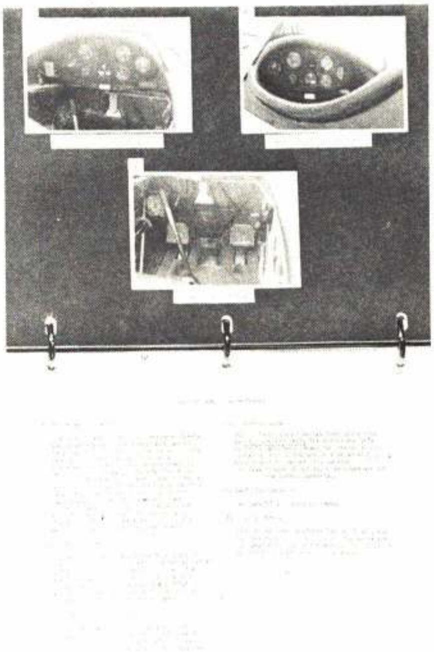
Start the presentation by selecting the three-view drawings. Next, find as many photos as possible of the plane you are building that show the detail you plan to add to the model.

Civilian type planes can be found at the local airport; so if that is your choice, take out your trusty old Brownie and snap away. If you have chosen a military type, a visit to one of the air museums can prove worthwhile. When taking pictures be sure to get all possible views: Both sides of the cockpit as well as the front view; front, back and side views of landing gear; top, bottom and side views of the tail assembly; both sides of engine cowling, etc.

A looseleaf binder may contain all the data necessary to prove scale aspects of a model. A good presentation makes judging chore easier and can get you more points in the scoring.



Photos show some of PT-19's front and rear cockpit detail. The sheet below contains various notes describing certain details and/or differences between the civilian plane and the U.S. Army version modeled.



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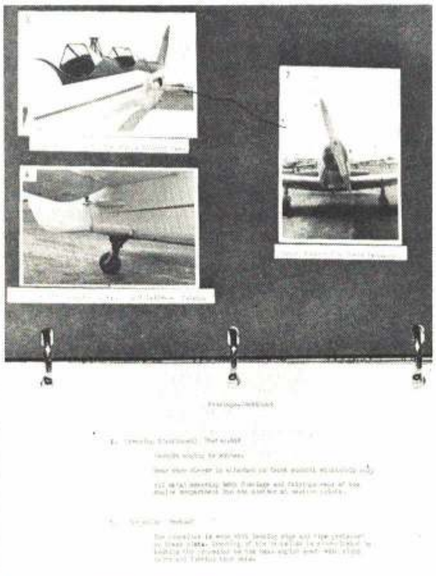
Try to get as much coverage as possible photographically—the position of foot steps, hand holds, access doors, hatches, and even the application of the plane's skin is not always the same on both sides.

Next, if possible, obtain written material on the general specifications of the plans, i.e., power plants, covering, color and markings, and any special features you're planning to incorporate in the model. After gathering the material together, you'll need something in which to lay it all out. A looseleaf binder for 8½ x 11" paper will do fine. In addition, some bond weight typing paper, acetate holders such as the V.P.D. Sheet Protector m-198 for holding the photos, and a set (1-12) of numbered separator sheets are required. An easy way to lay out your presentation is to break up the data into basic categories similar to those specified in the AMA Unified Scale Judging Scoring Form (shown in AMA Rulebook Section 31). The categories of the presentation could include the following information: (1) General Data—This section should contain information about the type of plane being modeled, manufacturerer, and its general use. In addition, the model specifications should be outlined; this includes the scale to which the model has been built, wingspan, length, height, weight and engine power. Modeler's name, address, and AMA number should also be included. (2) Basic three-view drawings and any other drawing data pertinent to proving special details of the model should be included here. (3) Fuselage, Engine Cowling, and Propeller data should be entered here; (4) Tail Surfaces; (5) Landing Gear; (6) Cockpit Detail; (7) Color and Marking; (8) Miscellaneous.

Several views are required to show all the detail in a particular section of the presentation. Here are three of seven photos necessary to complete the Fuselage, Engine Cowling and Propeller section.



The first step in laying out Sections 3-7 is to number and caption the photos to be used in a particular section. The captions should be kept simple, e.g., Front Cockpit-Instrument Panel; Rear Fuselage-Rudder Control Rod and Fairings; Landing Gear-Front View, etc. Numbering the photos permits easier referral to the written text.

After numbering and captioning one section, prepare the written text pertaining to it. The written text should point out special features you may have incorporated in the model as well as differences that might exist between the photos of the real plane and your model. In the case of the PT-19, for example, the written material pointed out significant operational features of the model, and also the various differences between the civilian plane photographed and the U.S. Army version of the model. This was necessary because when the plane was converted to civilian use certain equipment was removed from or added to the plane.

When you are satisfied that your photo selection and text cover all the details to be presented for the section, mount the photos and captions on black paper and insert same in the acetate protective holders. When mounting pictures, be sure that they are mounted in a manner that permits picture viewing and reading of the notes without turning the book.

After completing all sections, make up a Table of Contents that briefly describes what is in each section and place it in the front of the book. While it is not necessary, it might be a good idea to protect your written material with the acetate holders.

Before closing, a word or two about the photos. While 8 x 10" photos are great if you have them, they aren't necessary for a good presentation. The standard Jumbo size (3½ x 5") you usually get from the local photo finishers are adequate as long as they are fairly sharp and show the desired detail. You'll also do well to include at least one or two color pictures for the Color and Marking Section of the presentation.

A presentation made up in the manner described will provide the judges with a concise, straightforward layout of the scale data, and should also go a long way toward easing the judging chores. The benefit to the modeler will be additional points on the final score. Who knows? The extra points might just make the difference between winning and losing.

MOONEY ON FF

(Continued from page 42)

ing a variety of indoor sport type models (most of these also built by Watson, I suspect).

Due to the number of entries, the judging lasted far into the night and several of the judges were noticeably sagging before it was over. Not so, the wives of several of the Flightmasters who were helping with the registration—they looked great all evening.

Interesting models abounded, and on Sunday, quite a few of them flew very well indeed. Tony Nacarada's Mother Ady was flying

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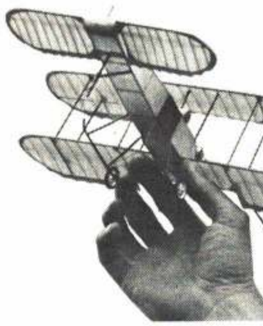

Warner's Biplane Canard.

Flightmasters' trophies ready to be given away.

Bill Stiles working on his Bristol Brownie.

a beautiful, electric-powered Aeronca. It flew out across the Sepulveda basin just like the real thing. Brick Brickner had a nice looking Aeronca, low wing electric also. The CO-2 category featured many nice models, but Fernando Ramos' DH2 and Hal Cover's Focke-Wulf stood out with respect to Scale.

In two respects, George Meyer and his model were unique. First, he came all the way from Texas, and second, he brought 16 models, most of them Peanuts and all of them interesting. Naturally, his model of the Little Toot biplane was superb. After all, he built the original.

Low wing models took the prizes in Peanut. Clarence Mather and Fudo Takagi placed first and second with a Thorp T-18 and a Miles M-18 respectively.

Bill Stiles of San Diego was still working on his entry up until the last minute. With the help of Marilyn Cover, he was able to get all the markings on his Bristol Brownie by the judging deadline.

SMITH ON CL

(Continued from page 36)

gestions, send them along as well. We need voices to make this work. Tell your buddies about it and let's get the rulemakers off center. J.C. Smith, 960 Brenner Ave., N.W., Massillon, Ohio 44646.

Junior-Senior Jet Pilots: I had a long talk with the Hoyts at the '73 NATS. As they practically own Jet Speed, manufacturing kits, engine reworks, etc., the conversation got around to the AMA NATS requirements that Junior-Senior fliers fly with the big boys in competition. With so much interest shown in Jet Speed, thanks to the Hoyts, it seems that something should be done to allow these younger fliers to be competitive with their own age group instead of having to fight for tenth place behind all the Open guys.

We talked over the possibility of putting the Jrs. and maybe the Srs. on a less exotic type of fuel—something that would not allow reworked engines. This setup would put the speeds around the 130-140 mph range, plenty fast for the 12-14 year olds. Then if they felt they could handle something faster, they could declare it and fly in Open, regardless of their age. The way it looks right now, Jrs. and Srs. will be flying 40s in Speed starting in '74. Why not put a limit on Jet, too, in order to allow many more to compete?

Do I Hear Ten Dollars?: This might be the cry heard 'round the Speed circles next year when someone else can drive your airplane for you. There are a few pilots who could really make a bundle if fliers would bid for their services. These are the ones who always seem to get a couple more mph out of a model. I'm not saying they lean on them, but they never seem to hold them back. Names won't be mentioned, but if you guys need a booking agent, drop me a line c/o AAM.

Pull Test Contest: At the Cleveland Junior Air Races in August, an unusual event was held. Billed as a special Slow Combat Event, every one showed up to fly at 6 PM. They were

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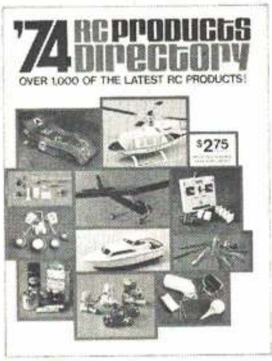
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AAM will present up-dates on the design during 1973 as experience of readers and designer shows need.

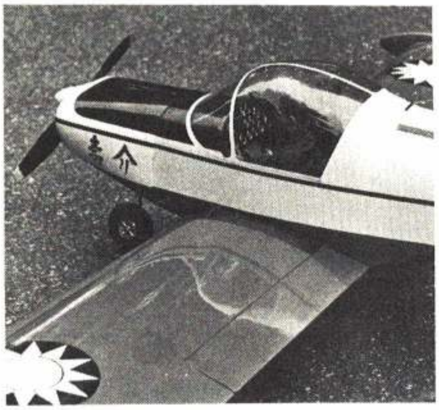
No. 0824, Ryan SC—Unusual 049 free flight scale model is low winger with excellent flight stability. Flies fast and handles wind easily. **$2.75**

then told that it was a pull test contest, with the winner taking 50% of the pot ($1.00 entry fee), along with the Special UPTIGHT COMBAT AWARD.

The reason I'm mentioning it here is to give some of the wild results. Of the 16 contestants who entered (some more than once—these Combat guys are nuts you know), there wasn't one airplane pulled apart during official competition. Lines usually gave up first along with the slide connectors, but what surprised me was the number of plastic handles that broke up. A number of Jrs. use these in Speed with many being used by all ages in Rat and Goodyear. While many airplanes don't give the pull during normal flying, a loose launch or line tangle could result in a big increase in pull. The handles in question were held by a bracket such as a hand would hold the handle. Some split, some just broke up completely, throwing parts as far as 20 ft. away almost as if they had exploded. The pull at the time was around 70-75 lb. when they let go. A very serious cut would have occured if this type of thing had happened while flying. So if any of you fliers use these handles, be sure they are in good shape. If they have cracks or splits, get rid of them. Handles are cheaper than doctor bills.

PAZMANY PL-1

(Continued from page 48)



A pair of differently decorated GI Joes pilot the craft from a full panel of Tatone instruments. Pilots won't add points in Scale, but give realism in action.

Sheet top and bottom with 3/32" sheet.

Sand the basic fuselage to shape. Build up the fin in place of the fuselage. Glue the tapered rear spar in place blocking it between the plywood pivots. Make sure it is square to the elevator. Add R-1, R-4 and the leading edge. When dry, add R-2 and R-3, sand to shape and cover with soft 1/16" sheet. Build the rudder in a similar manner.

The elevators are built separately and not installed until they and the fuselage are finished. Cement the leading and trailing edges to the ribs, pinning in place. When dry, sand to match the ribs and cover with soft 1/16" sheet. Add the trailing edge pieces and tips, then sand to shape. The antiservo tab is installed when the elevators are joined.

Make up the elevator bushings, pivots tube and horn. The horn is soldered to the pivot tube with both in place on the fuselage. Then the bushings are installed and epoxied to the plywood supports.

Before the tail cone blocks are cemented in place, the pushrods should be fitted. A three side-by-side servo tray was used for the Micro Avionics servos and is available for most others. Epoxy the mounts in place. Make up and install the rudders and aileron pushrods. The

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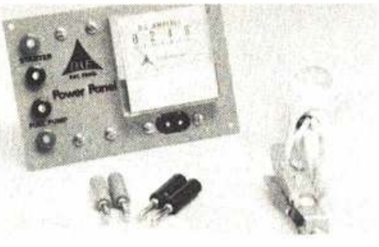

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rudder horn is similar to a strip aileron horn. The horn is installed but the rudder is not until after it is finished. After the pushrods are installed and operating, the soft balsa tail blocks can be cemented in place and carved to shape. Hollow out to clear elevator parts beforehand. If any control problems do develop later, a small hatch can be cut in the bottom sheet for access.

The cowl construction is different than the more common blocks or fiberglass. It is 1/32" plywood wrapped around the fuselage and C-1. C-1 is mounted on four legs off F-1 in the proper position. The plywood is soaked in water and wrapped around with the joint overlapped on the bottom. Hold with tape and rubber bands. When it has dried, remove it, epoxy around C-1, and the bottom joint, place a piece of paper between the cowl and the bottom of the fuselage so they won't get stuck together, and tape it back into place. When it has cured, remove it and you have the basic cowl. It may lose its shape when it is not in place, but this returns when placed over the fuselage.

Probably the biggest problem encountered in duplicating the PL-1 was the canopy. Much has been written on methods of molding cockpit canopies. It does take some time and work. Basically, one must carve a form to the shape desired, finish it (I used Hobbypoxy Two) and then pull the heated plastic over the form. This canopy lends itself to two-piece construction. The windshield section can be made from flat sheet and the canopy section can be pulled quite easily by hand because it is not as deep as it is with the windshield on it. Very little stretching is required. The large canopy shows off the Tatone instruments on the panel to good advantage.

A Tatone mount was used to mount the Supertigre 46. Pick a mount to suit the engine used. The engine was mounted inverted with a Tatone exhaust manifold to pipe the exhaust through the bottom of the cowl.

Build the wing over the plan. Pin down the 1/4" square bottom spar.

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Cement all W-3 and W-4 ribs in place. Block up the 1/4" sheet trailing edge spar and cement to the ribs. Add the 1/4" square top spar and leading edge. While still on the building board, sheet the top side of each panel. Remove from the board when dry and join the panels with 1" dihedral under each tip. Fit the sheeting, spars, and leading and trailing edges carefully at the dihedral break. Add the remaining ribs, landing gear blocks, aileron bellcranks and pushrods.

Since the top of the wing is sheeted, it can be fitted to the fuselage. Positioning the mounting dowels and blocks will be easier at this time. When completed, sheet the bottom surface. Build the flaps and ailerons. They could be assembled as part of the wing and cut away after sheeting instead of separately. Cut hinge slots and trial-fit control surfaces to wing. Do not epoxy until finished and ready for final coat of paint.

Carve the wing tip tanks from soft 1" thick blocks. Leave the area that butts against the tip rib flat. Epoxy in place or, if MonoKote is used as it was on the original, wait until they are covered.

I had been wanting to try MonoKote on a plane with a more intricate than usual color scheme. The fact that the real plane has a shiny finish was an additional factor that made me try it on this one. I am more than pleased with the results. The only parts of the model that were painted are the flat black inside of

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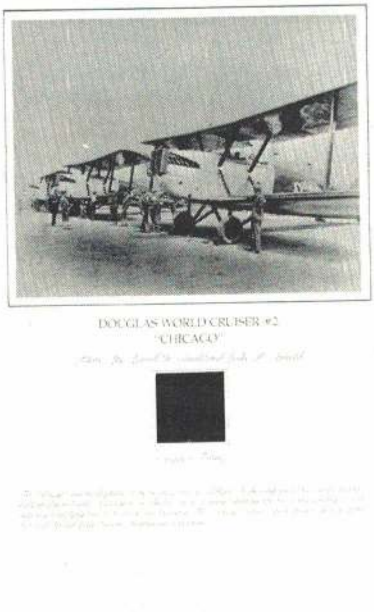

A square of fabric approximately 2" X 2" has been cut from the best portions of the "Chicago's" discarded skin and mounted on a handsome 15" X 20" poster under a colored print of the "Chicago" and her sister ships, the "New Orleans," the "Seattle" and the "Boston."

The National Air and Space Museum makes this valuable piece of history available to the public in time for the 50th anniversary of the "Chicago's" history making flight.

This will be the first of a series, and will be issued in a limited quantity. Worthy of framing, a highlight of any aviation collection, the ideal gift for the aviation enthusiast, this historic poster is not to be missed.

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the cockpit, and the black dope inside of the cowl. After over two years of on-and-off flying, the model looks as good as new. The only place that any wrinkles have shown up are on the flat sides of the fuselage below the cockpit. I have found that if the MonoKote is bonded to the wood, and not just shrunk over it, wrinkles will be avoided.

The bottom of the tip tanks have been patched due to scraping the ground but are hardly noticeable. It is far easier to repair a MonoKote-covered model than a conventional silk and dope finish. The only thing it doesn't have going for it is the advantage of the hard finish of paints. It is only as hard as the material under it. This requires gentle handling and an occasional ironing out of dents and bruises. I even used the MonoKote for hinging the flaps and ailerons. All the trim and insignias are done in Super MonoKote, not the sticky trim sheets—I find it much easier to position and apply, though not as easy to work with. Also, no sealing of the edges is required.

Each star is made up of fourteen separate pieces. There are six stars—84 pieces in all. The white center is applied first, a little oversize. Then the black ring is applied over that and finally twelve points are put on over the black. Lay out four points first, the front, back and two ends 90 degrees apart. The remaining two points between each of these can be easily located.

The flaps on this model are the most effective I have ever flown. Landings with flaps full down—about 45 degrees—are a real pleasure. When the flaps are lowered on the final approach, the nose gets a little light and it starts to sink. Apply a little down elevator and power if required. It can be brought in at quite a steep nose-down attitude without an excessive build-up of speed.

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In the air the PL-1 looks and flies like a real airplane. It is at home at a sport flying session or a contest lineup.

FF WORLD CHAMPS

(Continued from page 26)

mained. Landeau made 124 sec. and Agner 126, but local man Horcicka had 137 sec.

As darkness fell, car headlamps were turned on and cameras were flashing. The surging, enthusiastic, happy Austrians made it known that they were pleased, and triumphant Horcicka appeared on television screens throughout that beautiful land the same evening.

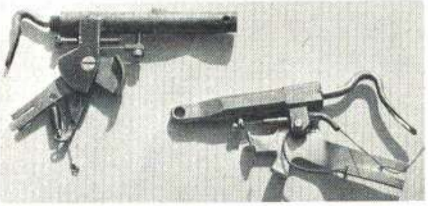
Rosalie Douglas of New Zealand was the only woman in the Glider event—her model was, in fact, "Lively Lady," Elton Drew's winning design at Wiener Neustadt in 1969 (full article in **AAM**). It was flown proxy by GB's Martin

Dilly, and he took it through to the fly-offs.

The results board soon filled up with predominantly pink "180" max cards, and no less than 41 competitors lined up for the exceptional fly-off. Five countries—Austria, Canada, DDR, Holland and the USSR—had a full team for this mammoth conclusion to three great flying days.

Eighty-two timekeepers were needed and appeals were made in three languages for helpers to use the watch. After a long wait, with the setting sun glowing over the Western mountains and a very light breeze, the fly-off began.

Russia made a masterly tactical move. Thirty-eight competitors towed normally into wind. Three Russians quickly ran out their lines and went off downwind! They had the immediate advantage of a clear field with no lines crossing and they went into circular towing at once.



Lepp's (USSR) glider tow hook gear is made from brass. The mechanism is supported and pivoted through the hole at the end of the main pillar.

Ian Kaynes, well-known British free flight protagonist and editor of *Free Flight News*, launches his Wakefield in the sixth round.

Everyone had his favorite. Mine was No. 218, Lepp, the Russian who was using a special four-way tow hook gear similar to the one which Bob Hatschek has developed for a smaller fuselage. I believe it works like this: (1) Pull forward, as usual, for straight tow. (2) Slacken line for right turn, operating port wing aileron. (3) Pull back slightly for left turn. (4) Snatch or catapult release sets rudder and timer.

But it was No. 219 Ekhtenkov and Vladimir Krejcirik of Czechoslovakia who tied for the final fly-off. A large crowd of spectators gathered. "Please sit down everyone!" The appeal was made in three languages over the loudspeakers. The crowd was very obedient at this exciting time and some 500 sat

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CLEMENS STYLE

(Continued from page 41)

order to get their flights in. (White knuckles must have been Fast Richard's nemesis. Ed.) One of the guys flying both was Dick Mathis of Dallas. He won C-Gas in an FF flyoff, only to have Sherwood Buckstaff of Houston chew off his streamer in CL-Combat. Curt Sanford, another Dallas FFer, placed in CL-Scale and Tom Peadon placed in Combat and Hand Launch Glider.

Patrick Hemple of Garland, Texas, won Jr. Scale with his fourth place NATS winning Hellcat.

Jimmy Clem and Mike Bussell, fresh from their fine performance at the NATS, flew Speed for two days and cleaned up in the Jr. Speed events.

Glen Moore of Abilene, Texas, took home the Sportsmanship Award. His pit crew held him to only a second place out of about six events. Billy Slater of the Ft. Worth Thunderbirds RC Club, and Bill Gattis of the Arlington (Texas) Golden Triangle RC Club changed places every flight in RC Scale. Slater's Fokker DR-1 finally nosed out Gattis' J-3 Cub for first, with Jeff Jenson's Citabria a close third.

Terry Rollins of Oklahoma City gave a demonstration with his Huey Cobra that was a crowd pleaser and enlightened a lot of the fliers on the field.

Larry Jennson's folded nose-wheel was the worst piece of bad luck for the RC fliers during the two days.

Nearly every big contest has a woman flier entered, but at this year's Southwests, Mrs. Geneva Davis of Irving, Texas, placed in Jet Speed. (Maybe Sinatra will record "The Lady is a Champ" to update "The Lady is a Tramp." Ed.)

Conversations with Bud Tenny and Murry Frank indicated that there were somewhat fewer contestants this year than in 1972, but that the overall Jr. entry was up. Much of the decline was due to the FAI Semi-finals only a few miles away.

For some really good fun and competition, and a chance to enjoy some of the sites and many fine restraurants in Dallas in 1974, make the Southwest Championships part of your Labor Day plans.

John Clemens has been CD or has worked (and is he ever a tough Scale judge!) for every Southwest Championships until this year, and he was angry with himself about missing this one. If there was ever a contest that has a history of hard work and leadership by outstanding modelers, the Dallas Southwest Model Championships has to be among the foremost examples.

TESTORS
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down. What a cliff-hanger! And incredibly, while waiting, the Russian managed a test flight of three min. seven sec. A little after seven o'clock, the green signal flare shot into the sky. The sun was sinking—there couldn't be any thermals.

Eggleston gives his engine a test run during the Power event. Model was one of the few with straight dihedral tapered wings. In background: Frank Schlachter (holding model) watches progress of high climbing craft with friends.

Thin aluminum tube front piece houses the rubber power. Front half of Dieter Siebenmann's Wakefield model is thin wall aluminum. Exploding rubber motor won't break it, but what a mess to get the rubber out! "Tranquillo" is the model's name, it is a highly warp resistant, geodetic ribbed design.

Ekhtenkov was away at once, into the circular towing he had used all day. The Czech had 148 sec., but Ekhtenkov made 162 with his model coming in right among the crowd. Everyone was ducking and running; cameras were flashing; it landed only a few feet from the starting point amid great applause. The serious Russian broke into broad smiles of enjoyment as the crowd pressed in on him with congratulations from all sides.

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A2

The Power event had proven to be hard work for the team managers and Dave Lindstrum welcomed the next day with Wakefield class, FIB. At least, the noisy engines were locked up. Thirty-one nations took out their Rubber models. Generous lift thermals continued, although sometimes these would disappear quite suddenly, leaving a model to come in fast.

The American team was never short on energy; they would race beneath a model with shirts waving to "whack up" a thermal and keep the model up. Once, while I was talking to Frank Motts, he suddenly stopped, whipped off his shirt and disappeared across the field in a whirling helicopter of pure energy. Seeing some models go up apparently as a result of such enthusiasm, many otherwise skeptical aeromodelers seemed to have second thoughts.

The Koreans, in their prominent green unitorms, seemed to find the thermals very easily. Kim Dong Sik made seven maxes and was consequently in the fly-off. They did have a neat bubble-blower only 12 centimeters wide, but they made little use of it. Most of the other teams worked their thermal detecting gear hard.

What of the solitary team member from Japan, Mitsuo Kobori? He took his unsophisticated model to third place! "Look," said Japanese team manager Shuji Suda, "Just plain model—no gadgets!" He gave a broad grin. Certainly it carried only a dethermalizer fuse as an extra.

Frank Parmenter missed out on three flights and Jon Davis dropped two sec. and six sec. on each of two flights. However, Robert White came through with seven good maxes, and the USA made it to the fly-offs.

Eighty-six entries dropped to 51 who maxed at the first round, but by the third round only 34 were still in. At round four, 23 were left with a full score.

Then only a single fly-off was needed. DDR lost its unbroken list of maxes in the sixth round, but two competitors were still in. The max was now raised to four min., but none of the final 12 reached it. Loffler of DDR made a clear 225 sec. in front of Kim Dong Sik of Korea; Kobori of Japan was third.

RESULTS CLASS FIC POWER

1. Horcicka, V./Austria	7 max	1.260 + 180 + 180 + 137
2. Landeau, A./France	7 max	1.260 + 180 + 180 + 126
3. Agner, S./Denmark	7 max	1.260 + 180 + 180 + 124
4. Englehardt, K./DDR	7 max	1.260 + 180 + 177
5. Weijters, J./Nederland	7 max	1.260 + 180 + 170

RESULTS CLASS FIB WAKEFIELD

1. Loffler, J./DDR	7 max	1.260 + 225
2. Kim Dong, Sik/N. Korea	7 max	1.260 + 200
3. Kobori, M./Japan	7 max	1.260 + 192
4. Wetterberg, K./Denmark	7 max	1.260 + 181
5. White, R./USA	7 max	1.260 + 154

RESULTS CLASS FIA GLIDER

1. Ekhtenkov, V./USSR	7 max	1.260 + 182 + 162
2. Krejcrik, V./Czechoslovakia	7 max	1.260 + 182 + 148
3. Spann, R./Austria	7 max	1.260 + 172
4. Sodini, M./Italy	7 max	1.260 + 167
5. Kang Kung, Sik/N. Korea	7 max	1.260 + 162

PATTERN CHAMPS

(Continued from page 18)

After Matt's flight, it seemed that he would be the champ since no one thought it would be possible for Yoshioka to beat Matt.

Yoshioka did find the combination that the judges wanted and put in what turned out to be a flight almost equal to Prettner's highest flight of the finals. However, many seemed to think that Matt had won because Yoshioka's flight didn't appear to be that good. It was quite a surprise to find that the flight was judged so well. For the first time in modeling history, Japan has reached a World Championship level.

Incidentally, Jim Whitley and Phil Kraft both critically judged all the final flights just as if they were judges. They placed Matt first and Prettner second.

Spectator interest in the Japanese fliers was enthusiastic. Obviously, the European spectators rooted for the Japanese. Loud rounds of applause are normally given for outstanding maneuvers. The applause was given for the Japanese, especially Yoshioka, for maneuvers that were not of the outstanding type. Maybe the Japanese were the underdogs. Switzerland, Germany, Austria, Liechtenstein and the U.S. all have had their turn. Maybe the spectators wanted to see someone new on top.

The winner, Tsugutaka Yoshioka, and his teammates were all new to international competition activity. Yoshioka flew a modified version of Kato's design (Kato flew at the 1971 Doylestown Internats). An Enya 60 III with a special

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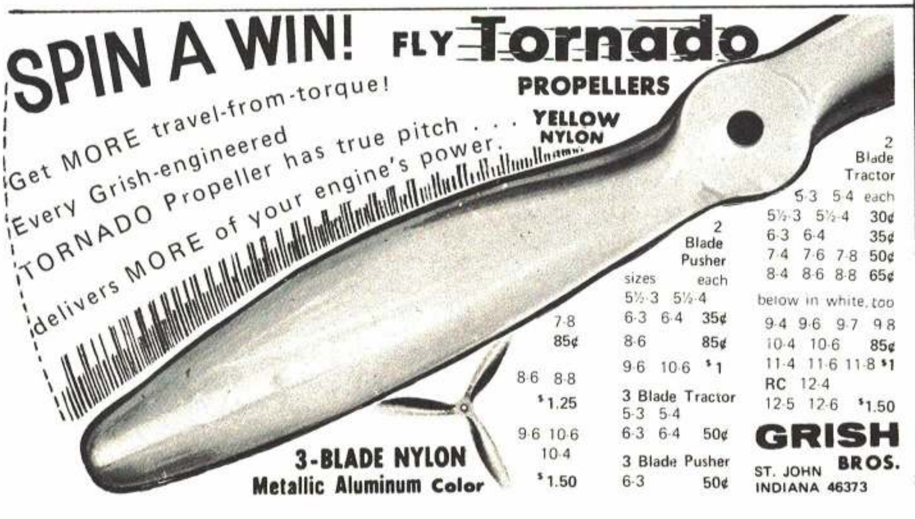

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throttle that worked off of crankcase pressure was used. A pressure regulator was fitted to provide the correct pressure when the engine was throttled back. The intake opening on the carburetor was very large by normal standards. Although the fuel burned was 45% nitromethane, the engine didn't seem to be really turning on by our standards. In fact, it didn't seem to run much faster than a normal Enya 60 III (which is a powerful engine with stock carb). During practice flights, the engine did act up and readjustments had to be made. During the competition, however, it ran perfectly.

Moderate sweepback is employed on the winner's model giving a similar appearance to Don Lowe's Phoenix. The model was not especially fast. Airfoil was on the thick side with a straight line taper occurring on a major portion of the trailing edge. Strip ailerons and retracts were used. The finish on his model, as well as the other Japanese aircraft, was excellent.

Second place winner Wolfgang Matt flew SuperStar, an aircraft similar to the one he had flown at Doylestown. An HP 61 engine powered the model. It was interesting to note the extremely rapid roll rate of his model. Three rolls were done in 3-4 sec.

Hanno Prettner's third place model was also similar to the model he had at Doylestown. A new Webra 61 Speed engine was used with excellent results. An interesting addition to the model was the use of approximately six-in. long flaps. The pivot of the flaps was such that when they were actuated, an equal amount of flap was positioned above and below the centerline of the airfoil. Using the drag flaps, he was able to make excellent landing approaches without changing throttle settings. There appeared to be no pitch changes with full flap deflection. At the right trailing edge aileron/tip and elevator/tip junction, he employed a raised parallel wire unit to accurately check neutrals before takeoff.

Harald Neckar's fourth place Mephisto model, powered with a German HB 61, was an attractive conventional looking low wing model of standard size. A full flying stabilizer was used with good results. It wouldn't surprise me to see Harald in the top five again in the next Internats.

Norm Page flew his popular Mach I design to a well deserved fifth place. Norm used one of the new Ross 60s. The Ross performed very well and was obviously one of the most powerful engines there.

Both Jim Whitley and Jim Martin were not up to their usually peak performance. Minor errors by both Whitley and Martin were in evidence—wings not level, climbing or diving slightly, altitude gains or losses, little heading changes, minor errors in positioning. Their maneuvers were good, but the little things so important in international competition were off balance.

Very few developments were seen in the designs flown this year. With about two exceptions, the models were practically identical to the ships flown at

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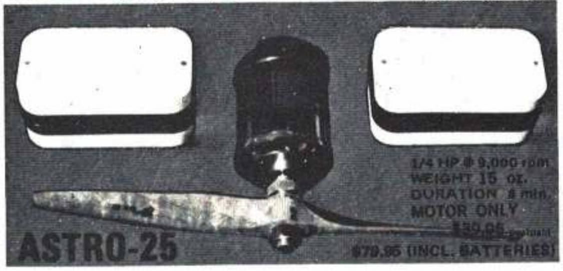

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Doylestown in '71 and to the majority of the ships flown in Bremen in '69. The exceptions were two models with full-moving stabilizers: Neckar's and Bruno Geizendanner's (two-time winner of Internats) radical Salamander design.

Geizendanner's model could take up a whole article. (See Don Lowe's column in March 1974 AAM.) His shoulder wing ship had a most interesting in-flight actuated variable wing sweepback system. During takeoff, the wings were in the normal straight position. During certain maneuvers (e.g. rolls), the wings were moved back to the 45° position. The wing sweepback system could be employed at any time. The linkage/servo system was kept secret. In fact, we were told that even the other members of the Swiss team had not seen the system. One second-hand source said that the actuator was freon gas operated. The transit time from 0° to 45° appeared to be about one sec. He also had a full flying stabilizer and retracted all three landing gear legs into the fuselage. A Webra 61 Speed powered the model. Unfortunately, the flying performance was disappointing. Quite a bit of design work and practice is still required for him to make use of the variable wing geometry principal.

During the registration of Geizendanner's models, an interesting problem came up and he was temporarily disqualified by the contest director. The FAI rulebook requires that the model flown must be the fixed wing type. Geizendanner's model did not have a fixed wing since it would be moved during flight. A minor side argument was also brought up with the movable stabilizer. It also produces some lift and also is not fixed. The FAI jury decided to allow the model to compete.

Based on information in the official program and other sources, it seemed that the most popular engine was the HP 61. Unofficial count of the various engines was: 29 HP 61s, 20 Webras, seven Supertigres, five HB 60 (German), four Rossis, two Enyas, OPSs, OSs, Ross's (USA), Mokis (Hungary) and one Veco 61. Three entries were not accounted for. A wide range of radios was used. Noticeable was the increased use of Pro-Line radios.

Why didn't we win? Jim and Norm can perform a ten on any given maneuver at any given time, yet we still didn't come out on top.

A major point of consideration is the European style of flying. The so-called "style" seems to change now and then, but in the last few years it has stabilized. For international competition, we must adapt to this style. Europeans generally fly into the wind, regardless of the runway direction. We fly parallel to the runway at all times if you want maximum points. Perhaps this may not seem important, but look carefully at the aircraft requirements. The slower type of model such as a Kwik Fli and Kaos are very easy to fly into the wind, but flying that type of model

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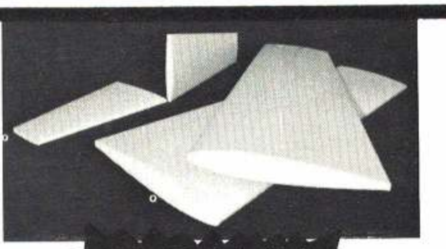

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in a strong cross wind creates serious problems of positioning and holding headings. The top fliers get around this problem with aircraft with thin airfoils and all the horsepower they can get. High speed and high power make crosswind flying much easier. Take the high speed "Blue Angel" type of model and fly it European style into the wind—it becomes an equal design. The only difference would be that our ships are flying much faster and require more sky in which to fly.

The judges at the Internats come from all over the world, but the majority of them come from Europe. They are used to seeing the slower flying models that require less sky. This type of model and this style of flying are the standard. Our models are now at a disadvantage since we are now the unusual instead of the norm. Maynard Hill (U.S. Judge) stated that he asked the other judges why they didn't like the performance of the American fliers. (We were not achieving good scores for obvious quality maneuvers.) The answer was that the other judges were not used to the high speed and large maneuvers and couldn't give premium points for such maneuvers. The rulebook doesn't say this, but this is the way it is.

The majority of the better fliers reduced power during turn-arounds instead of doing climbing split Ss or high speed diving turns. Their aircraft were flown at nearly a constant speed. Major throttle changes during maneuvers were quite common. One flier even reduced power greatly during the upright and inverted portions of the four point roll.

The judges at this Internats wanted to see the models flown close and with the tops of the maneuvers not too high. High speed was not appreciated obviously. Maneuver length was also kept to a minimum. Matt, with his fast rolls kept his distance traveled to a minimum. Of course, our ships took all kinds of room, especially Page's and Martin's. It took our team a little time to realize this change of style. As our guys tightened up the maneuvers and brought them in a little closer, our scores went up, but we still didn't get the points we deserved. If there had been a strong crosswind during the competition, the end results would have certainly been different. Our team would have placed much, much higher.

Perhaps, if our team had been selected early in the summer of the Internats (as in many other countries), we would have been more highly trained and polished. With a year's notice, there is a tendency by some to change designs and equipment and worry about these problems instead of practicing. Speaking of practicing, it has happened that, due to occupational requirements, one may not be able to put in the time for practice that he could the year before. I would propose a team selection competition the year before the Internats to select 20 fliers. A flyoff of those 20 fliers would be made 60-90 days before the Internats. Perhaps then we would be able to field a more highly trained and polished team.

Our team of Norm Page, Jim Whitley and Jim Martin and team manager Ron Chidgey did an excellent job of representing the U.S. in the most competitive Internats in history. Don't overlook the fact that we placed second in the team-standing under very stiff competition.

TEAM PLACINGS

1. Japan	35,670
2. U.S.A.	35,115
3. Austria	34,490
4. West Germany	33,985
5. Canada	33,220

RESULTS

Name	Country	Total
I. Yoshioka	Japan	28,440
2. Matt	Liechtenstein	27,950
3. Prettner	Austria	27,935
4. Neckar	West Germany	27,855
5. Page	U.S.A.	27,520

EDITORIAL

(Continued from page 6)

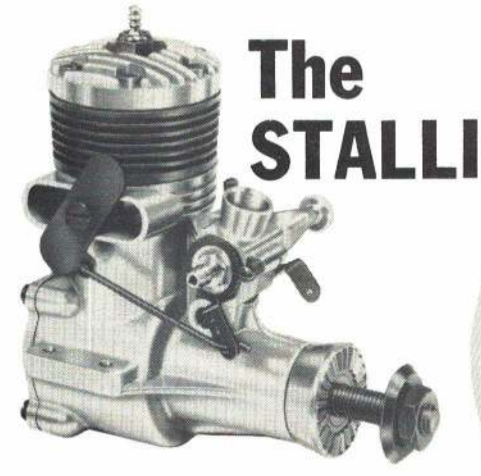
the market's problems and shortages. The same approach to the present environmental and energy problems must be taken. We must first acknowledge that there is a problem. Then we must analyze it and report it—as it affects our modeling.

Lately, I have been very much involved with electric flight—mostly RC. I have been flying three very different battery-powered planes. They don't pollute. They use very little energy. And they fly well in small fields. These planes have even been flown right in the middle of Washington, D.C., and no one even noticed. Perhaps it is the small, or quiet, or electric models, or gliders, or QZ 049 powered planes (or its equivalent in quiet) that we modelers will be flying in the near future. Mind you, I am not just speaking of RC. These limitations and others apply very much to FF and CL.

I am soliciting your ideas and experiences related to the energy crisis and environmental limitations. These experiences may explain how you fly, where you fly and what you fly. Write to me about experiments you have been doing to fly silently or closer to home, etc. We want to know how you will deal with environmental problems.

Suppose you can't drive on Sunday (because of State or Federal law). Will you just stop modeling? I doubt it. If you are a slope flying enthusiast, will you decide to try flying in town from slope lift from a local building? Will you try modifying a Mattel SuperStar motor for your duration FF model to fly in a park where gas motors are not allowed? Did you invent a new muffler for that honking 60? Maybe you have tried electric CL with current in the lines to a motor in the plane? If you can't drive to contests, will your club cease to hold competitions—or will the character of competition modeling become more local or limited?

All responses will be studied so that AAM can present some possible solutions to the energy and environmental problems in terms of their effects on modeling.



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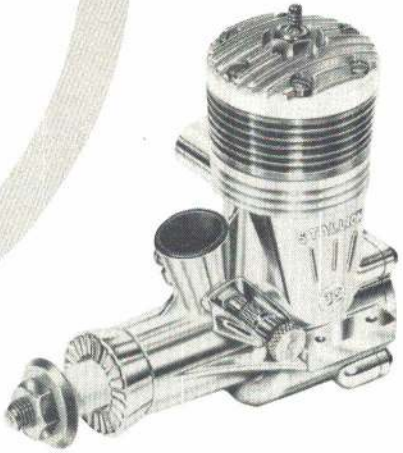

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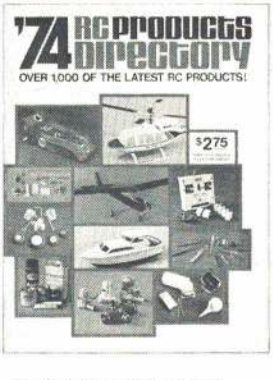
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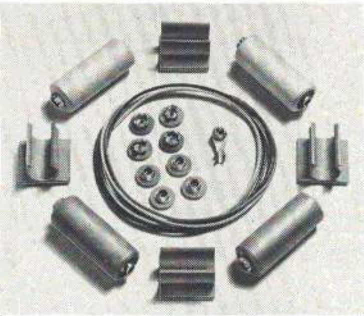

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ORBIT HAWK

(Continued from page 64)

nician to easily check the radio with an oscilloscope without having to go into the case at all. The entire package is very neat and orderly.

Servo: Orbit PS-6 servomechanics are supplied with this radio. This gives a very small servomechanism and is the same one utilized with most Orbit radios. As mentioned, the servo is very compact and the result is a very tightly packed servo amplifier board. An integrated circuit amplifier is utilized which has the driver transistors internal to the chip. Even so, an additional 17 components are mounted exterior to the IC on the servo amplifer board. With limited space available, this gets to be a very crowded board which should be left to the service centers if any work is needed. The motor utilized is a 16mm diameter Mitsumi. The servo features a rotary output which gives four lb. of thrust at the outer hole or 20 in.-oz. of torque. The servo amplier is of the bridge type; therefore it requires only a three-wire lead.

Battery Pack: The radio uses dry cells in both the transmitter and receiver. The transmitter battery is an NEDA 1603, nine-volt dry battery, and the flight pack utilizes four AA size alkaline batteries. The switch harness is permanently wired to the battery case. Extreme care should be taken while installing the flight batteries, since reverse polarity will cause damage to the flight system.

TOP FLITE S.E. 5a

(Continued from page 66)

spite vibration and a few ground loops! I would recommend removing the Lewis gun on the top wing, however, since it is most vulnerable to bumping and nose overs.

Use a large prop in the 12-in. to 13-in. range with a low pitch to keep the high torque down. The landing gear on the S.E. 5a has a narrow tread and high revs can make it do spectacular ground loops.

When taking off, don't "nurse" it into a gentle ground run, but instead, hit the throttle hard and let the plane stabilize itself. Avoid using much rudder throw since it is very sensitive.

Outside of its ground handling idiocyncracies, the S.E. 5a breaks ground realistically and once in the air its silhouette and flight could only be topped by the real thing.

TROJAN TENDERFOOT

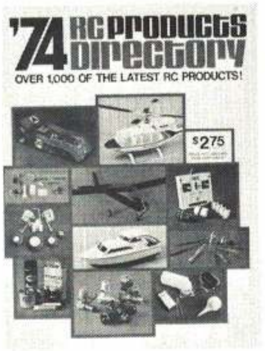
(Continued from page 61)

wing tips so that the doublers fit flush with the correct amount of dihedral. When dry, reinforce the joint with hinging tape and three or four coats of glue.

While the wing assembly is drying, work on the fuselage. Trace around the fuselage pattern onto 3/8" thick balsa. The canopy top section will have to be cemented on if you are working with four-in. wide balsa sheet. After the fuselage is cut out, cut away the lower section and cut out the slot for the main wing section. The lower section will be added again after the wing is in place.

Next, cut the nose section off the fuselage pattern which is the plywood engine mount section. Trace around this onto 1/16" plywood and cut out. Drill the holes for the nose landing gear strut. The gear strut is bent up out of 1/16" diameter music wire. Lash the strut to the ply with carpet thread and glue heavily. Next, cement the engine mounts to each side of the fuselage.

After the wing main section is dry, glue this into the fuselage wing slot. Make sure it is aligned correctly. When this assembly is dry, add the fuselage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A2

lower section. Give a couple of coats of glue to the joint lines. While this is drying, the landing gear struts can be bent up out of 1/16" diameter music wire and then lashed to the 1/16" ply landing gear mounts and finally cemented in position on the wing. Give a couple of coats of glue to this.

When all this is dry, the leading and trailing edge sections can be cut out of 3/8" sheet balsa. These can now be cemented in position on the main wing section.

Now the tail sections can be assembled. The stabilizer and elevator are both cut out of 1/8" sheet balsa. The elevator center section is made of 1/16" hardwood doweling. After the elevator sections are put together, the elevator must be hinged to the stabilizer. With a length of hinging cloth, glue one end to the top of the stabilizer and the other end to the bottom of the elevator. Then, on the same side, glue one end to the top of the elevator and the other end to the bottom of the stabilizer with another length of cloth. Repeat both steps on the opposite side of the centerline.

Now, cut out the dorsal and vertical fins along with the rudder from 1/8" sheet balsa. Glue the rudder to the vertical fin. Be sure to offset the rudder 1/4" to the right. Let dry.

By this time, the fuselage/wing assembly should be dry. The stabilizer assembly can now be cemented in place. Be sure that it is aligned correctly. When dry, add the vertical fin/rudder assembly; make sure that this is correctly aligned, too. Also add the canopy top section.

Now the bellcrank mount and leadout guides may be added.

When everything is dry, you now have the "enjoyable" task of sanding. Sand the wing and wing tips to an airfoil shape, as well as the tail surfaces. The fuselage top and bottom may also be rounded off a little.

Hold your engine to the nose. With a pencil, mark the bolt hole locations. Drill them out at this time. Smear some small eye screws with cement and screw them into position so that they will hold the fuel tank in position with rubber bands.

After sanding, the airplane is ready for finishing. First, apply about three or four coats of clear dope, sanding between each coat. Now you can apply two or three coats of colored dope and then two coats of clear to protect the finish.

I finished my own model in white Super MonoKote with MonoKote trim. You may not wish to do this, however. I gave my model Navy markings which can be seen in the photos. There are some civilian T-28s around, so you can give your model your own personal color scheme and still have a realistic looking model.

When the paint is all dry, bend up a pushrod the right length so that when

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the bellcrank is neutral, the elevator is neutral. If you haven't already, mount the bellcrank and control horn. I used Perfect brand for these parts. The pushrod will have to be bent so that it will clear the wing trailing edge.

Now, add the leadouts to the bellcrank and route them through the holes in the fuselage and then through the leadout guide. Mount the engine and fuel tank. Your T-28 is about ready for flight. It should balance at about mid-fuselage at the leading edge of the wing.

The T-28 is a good flying airplane. For takeoff, just hold it on the ground until speed builds up and then ease back. The T-28 will make a realistic takeoff. For landing, keep the T-28 close to the ground near the end of the engine run. When the engine quits and it is about three ft. up, ease in full up elevator and you will have a good landing.

LOWE ON RC

(Continued from page 16)

three rolls and three loops of the Class C Aerobatic Pattern. For those who may not have tuned in for the historic beginnings of this treatise (shame!), we are attempting to expound on guaranteed ways and means of scoring 9s and 10s for each Class C Pattern maneuver. So, if Pattern is your thing, hang on for a few lines—we have just completed three gorgeous loops and are headed upwind.

OK, accomplish a pretty turnaround (remember, turnarounds are not supposed to be graded but, judges, like everyone, are impressionable). Head back downwind parallel to the upwind track about 50 ft. high and 150 ft. out. Now start your Four-Point Roll. Set it up so you will be inverted in front of the judges to balance the maneuver; call maneu-

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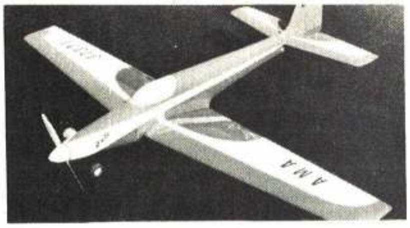

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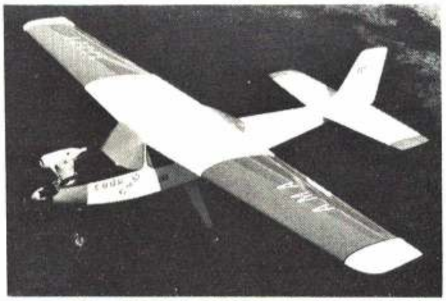

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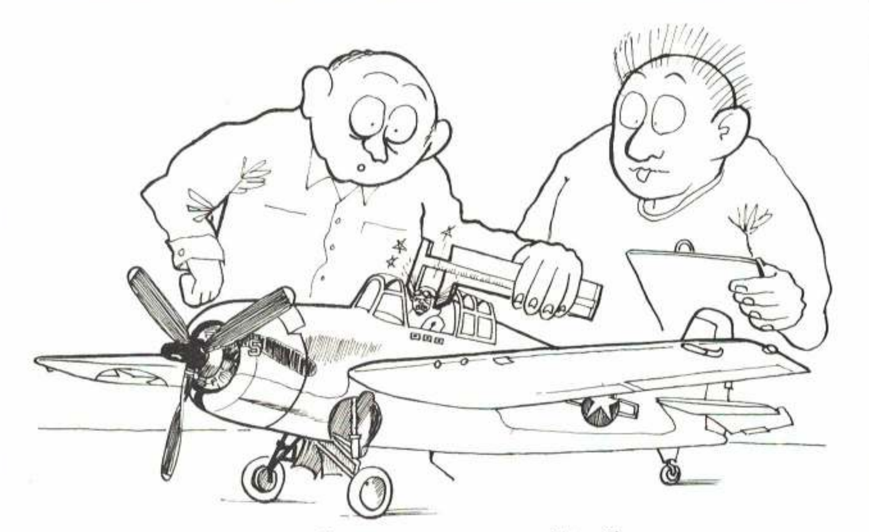
ver; fly straight 50 ft.; roll crisply into the first point, but not necessarily at maximum roll rate. It's easier to mix the rudder and elevator and stop on point if you roll a little more slowly. As you roll (if it's to the right), smoothly apply left or top rudder throughout the maneuver; do not roll to point and bang in rudder or elevator. As you roll to point, slowly apply top rudder and elevator (if needed). Most ships won't need elevator except when inverted if ship is designed and trimmed correctly. I usually don't change elevator trim throughout flight after trimming for level flatout conditions. If the craft tends to turn a bit while on its side, you will have to correct with elevator. A correctly designed and trimmed ship should not need any aileron correction while in knife-edge (first point) either.

If it tends to roll, hold a little aileron. Ideally, you should hit the point and hold only top rudder in order to stay there. If the ship tends to roll in knife-edge, it has either too little or too much dihedral; if it rolls inverted, it has too little; conversely, if it rolls out upright, it has too much. If it is necessary to hold any aileron or elevator, the maneuver is made much more difficult. OK, now roll to inverted, slowly release the top rudder. Hesitate and roll to the next vertical point slowly mixing top (right) rudder and releasing down elevator. Pause and roll to upright flight slowly releasing the top rudder. Exit straight and



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level. Call maneuver complete (after 50 ft. or more, straight exit and not before!).

One additional point: Perform this maneuver with plenty of steam—you will need much less control motion. The aircraft will slow down and change attitude less and the maneuver is much easier. The craft must change attitude while in knife-edge since it is deriving lift from the fuse and it is not a very good wing!

If you hear a strange noise while in this attitude, don't fret because it's simply turbulent separated flow off the fuse since it's flying at an angle of attack. A small change in fuse attitude in knife-edge should not be grounds for grading down since this is the only way it can generate enough lift to sustain level flight. That's the name of the game; we don't want an arching ballistic trajectory such as is commonly seen.

Now we're headed downwind (always do the rolls downwind) into a beautiful turnaround. Head back upwind parallel with the outbound flight path and perform the Figure M. This maneuver, like all others, is balanced in front of the judges. After calling maneuver and accomplishing straight entry, start pullup to the right or left of judges (depending on wind direction) and space out far enough so that top of the maneuver will not exceed 45° elevation. Pull smoothly straight up at full power. When vertical, pull off power and allow the craft to coast down to almost zero velocity. Be sure pullup is absolutely straight.

DO NOT cheat by leading with the rudder as many do. On top, kick full rudder right or left and blast the throttle (on and off) to develop slip stream over the rudder to get it to go around. Remember, if you can bend it around without kicking the engine, you're moving too fast and that's cheating. The ship should pivot sharply around and head straight down. This is the tricky part of the maneuver since the aircraft's speed, attitude, rudder deflection and power are all crucial to getting around cleanly. You will simply have to practice this to get used to the peculiarities of your own airplane. Some ships will tend to pitch or roll when kicked around and you must compensate by anticipating with aileron or elevator. This, of course, makes the maneuver more difficult. Crosswind and head wind will influence the vertical track and you must compensate with elevator and rudder. There is absolutely nothing like practice to learn what to do in all possible conditions. It's easy in calm air conditions, but you will rarely encounter this at contests!

We're headed down. Slowly apply full power and perform the half outside loop, placing the bottom in front of the judges and at the same altitude as entry. Fly around until vertical, pull off power and coast up to same altitude as the first vertical leg. Slow down, kick rudder (in same direction as first) and throttle. Remember go right-right or left-left with the rudder, or you'll get a zero and credit for a double stall turn! When ship is vertical again head down into a smooth pullup and exit at entry altitude and track.

A couple of tips: Some think that the ship should oscillate after the stall turn on the way down. This supposedly proves that the aircraft was very slow in the turnaround. This oscillation isn't necessary for a good maneuver since you can virtually eliminate it with aircraft design and technique. A long tail moment airplane will do this less than others; also releasing the rudder slowly after the stall turn will drastically reduce the oscillation.

In addition, a forward CG makes this maneuver much easier and requires less rudder throw. Usually, you will set your rudder throw for this maneuver which gives you more than you need for others. The variable CG gimmick with which John Agee and others have worked help here.

An aft CG helps rolls and spins. Maybe a variable sweep airplane isn't a bad idea if worked out properly—you could easily shift CG in this way. If you don't want these gimmicks, you must set up the aircraft with the best possible compromise CG for all maneuvers. That's what most of us do!

Well, we will leave Joe Flier headed upwind anticipating an unbelivable Horizontal Eight in the continuing saga of Joe Flier, Boy Expert. Tune in next time for another thrill packed adventure.

SUDDEN SERVICE PLANS
CHECK PAGE 84

McFARLAND ON CL

(Continued from page 16)

Greatest Thing For Stunt: Since the Nobler, Wynn Paul and Keith Trostle (current Editor, Treas., Sec., and Pres. respectively) got their heads together with other active Stunt pilots, there was enough enthusiasm to form the Precision Aerobatics Model Pilots Association (PAMPA). An organizational meeting was held at Oshkosh during the Nationals and a nucleus was formed. Goals were set for better communication, enactment of appropriate rules and training of qualified judges. All functions are to work within and for AMA. Send dues of $5 yearly to Wynn Paul, 1640 Maymick Dr., Lexington, Ky. 40504. It's a real bargain even without the very worthwhile newsletter. If there is no one in your neighborhood who shares a common interest in Stunt, there may be someone in PAMPA with whom you can share your problems and accomplishments. To be a member of this group the only requirement is enthusiasm for Stunt. PAMPA is another way to get in on the action.

Move The Capital: That's right. There is an effort to move the STUNT CAPITAL of the WORLD back to Lexington, Ky. from Irving, Texas. Yet there are some who say it's really Cleveland; others say New York, and even a few places Down South are starting to point with pride. What do you think?

Contest Action: Good to see the Indianapolis group active again and putting on a good contest. Looking for upcoming action? Try the King Orange in Jacksonville, Florida, during the last few days in December. Tom Dixon, Les McDonald and Jerry Ross will be running the Stunt Show so you can expect some real flying.

AAM COMMANDER

(Continued from page 70)

ence CH 2, Elv on Fig. 3) on the two-channel, we feel it is better to route a single +3.6 1 volt "bus" wire to all four control pots. The mechanical interconnects to be discussed next will show how.

Making the Mechanical Interconnects; Converting the Two-Channel Box—The third channel can be added quite simply by adding any 5 or 6K ohm pot wherever it is convenient. The arrangement shown in Fig. 4 is a bit more professional. First, make the printed circuit board shown in Fig. 2. It mounts directly to a 1000 ohm slider pot available from ACE RC or from Royal Electronics. The 4K trimmer is used to set the control pulse to 1.5 milliseconds with the 1K control pot centered.

Use a Dremel Moto-Tool and abrasive cutting disc to make the slot in the transmitter case. Nylon control rod can be used for the standoffs. Connect the new control pot wire and +3.6 volts from the transmitter board and you now have three channels.

Getting four channels into the old two-channel box was pressed upon us by AAM's editor. It seems he thought we promised to do it. We don't remember but, in any event, here's how it's done. The third channel control can be added as we just described. However, getting the fourth channel in requires some doing and can only be achieved using a three axis stick assembly. Either of two approaches may be followed.

For first approach, purchase a Heathkit, Orbit, Kraft or other three axis stick and install it. Of these, we have examined only the Orbit stick by assisting Ed Loman in working one up.

(Continued on page 110)

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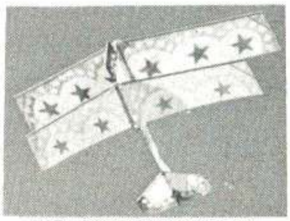

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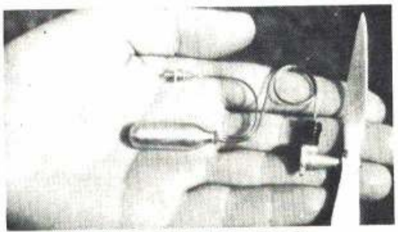

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1974-75 RC and General Rules

Voting deadlines by the Radio Control and combined Contest Boards prevented earlier reporting of the proposals in these categories which succeeded in passing two preliminary votes and then the Final Vote to become new or changed AMA competition rules for 1974 and 1975. The information is now at hand, though, so that with the new RC and general rules which follow, plus the new CL, Scale and FF rules reported in this section last month, there is altogether a rather complete picture of how competitions in the next two years will differ from 1973.

When the new AMA rule book will be available, incorporating all of these changes, is still unknown. In some cases only the basics of new rules were voted into effect, requiring additional work by Contest Boards in finalizing rule book language. Hopefully the time schedule of new rule book availability will see an improvement over recent years, when the updated book frequently was not ready until about the end of February. In the meantime, base your competition planning on the information in these pages.

RADIO CONTROL

GLIDERS. The board has voted to change the status of these rules from provisional to official. ** A revised Task II has been accepted on a provisional basis for trial (does not replace original Task II). The major revisions are to award bonus points for the last 30 seconds of a max flight and to increase the landing area size to 164 feet square. ** Similarly, a revised Task IIA has been accepted on a provisional basis (not replacing original Task IIA). Provisional Task IIA imposes penalty points on each of the first two flights if of over seven minutes duration and makes optional the inclusion of a landing requirement.

QUARTER MIDGETS. The rules put forward during the 1973 Toledo RC Conference were adopted provisionally. These rules require semi-scale racing planes, stock .1524 max. cu. in. engines (diesels excluded) of 1,000 minimum availability, mufflers optional with the Contest Director (tuned pipes prohibited), unaltered stock propellers except for balancing, minimum fuselage width of 2¾" and depth of 5", wheels of 1½" diameter or larger (retracts and brakes prohibited), 300 sq. ins. minimum wing area and 7/8" minimum chord at fuselage for monoplanes, total weight between 2½ and 4 lbs., commercial fuel with maximum of 15% nitro content. Required engine idle may be spot-checked before a heat; engine not running at touch-down loses one-half point. The race course consists of two 478' legs and one leg of 100'; the start-finish line is 100' from and parallel to the 100' leg.

PYLON FORMULA I & II. The Sideline Judge position has been relocated 300 feet from the No. 3 pylon; the ready, pit, spectator and parking areas are moved accordingly. ** The minimum engine quantity for eligibility has been increased from 100 to 1,000.

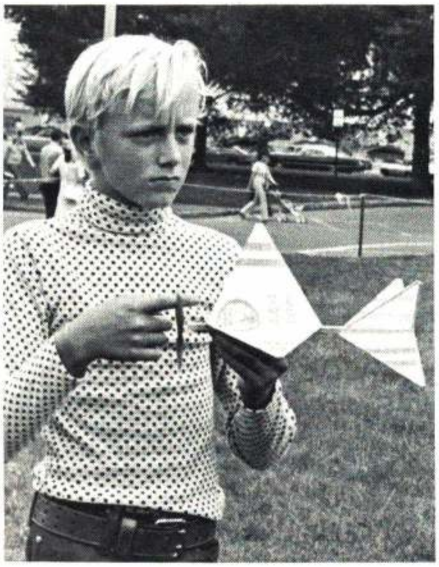
PATTERN. A new system for advancement from one class to another (from A to B, B to C/Novice or D/Novice, C/N or D/N to C/Expert or D/Expert) has been adopted–involves number of entrants as well as place position. Those who win 1st, 2nd or 3rd are awarded, respectively, 3, 2 or 1 points; these points are then multiplied by the number of contestants who actually flew against the winner in each event and class; upon acquiring 100 points the flyer is advanced to the next class. Points will be recorded on special forms to be provided by AMA HQ.

The Radio Control Contest Board also has endorsed a new Class C Trial Pattern as developed primarily by Don Coleman and Ron Chidgey. The existing Class C Pattern remains unchanged, but the board recommends experimentation with the trial pattern as per the following rules.

The new Pattern advancement system takes into account place position and number of entrants—intended to cure the former system's fault of too rapid advancement when small meets were involved. The RC Contest Board also suggests a new Class D Pattern for trial purposes. Photo from 1972 shows Gary Anderson with his Kaos; he was a Class A Pattern flyer then.

Left: The status of RC Glider rules has been elevated from provisional to official, and two revised tasks have been introduced on a provisional basis. But there is another reason for this particular photo. It shows Elinor McEntee presenting her late husband Howard's beautiful Cirrus glider to Hans Graupner for the Graupner model display at the factory in Kirchheim/Teck, Germany. Howard built the glider in late 1969 and had flown it hundreds of times up to August 1971 at Lakehurst, his last meet. Photo by Walt Good.

Right: The FF AMA Cub event is one of six supplemental events approved by the combined AMA Contest Boards for introducing youngsters to modeling. The low cost AMA Cub model shown, designed by AMA Technical Director Frank Ehling, may be flown in the event bearing its name and also in the FF Special Rubber event.



27.16 Class C Trial Pattern (Novice & Expert).

16.1. The maneuver schedule will consist of five maneuvers from each of the three groups, in addition to takeoff and landing. The three groups will vary in difficulty and carry K-factors of 5, 10 and 20. The maneuvers and K-factors are as follows:

Takeoff	K=5

GROUP I (Select 5)

1.Combined Immelmann	K=5
2.Three Horizontal Rolls	K=5
3. Touch and Go	K=5
4. Snap Roll from Level Flight	K=5
5. Square Inside Loop	K=5
6. Inside-Outside Vertical 8	K=5
7. Vertical Fig. S from top	K=5
8. 3-Turn Precision Spin	K=5
9. Hammerhead Stall Turn	K=5
10. Knife-Edge Flight	K=5

GROUP II (Select 5)

1. Cuban 8	K=10
2. Slow Roll	K=10
3. Horizontal 8	K=10
4. Rolling Circle with half roll at 90-degree points	K=10
5. Outside-Inside Square S with vertical half rolls	K=10
6. Rolling 8	K=10
7. Loop with one Snap Roll at Top	K=10
8. Square Outside Loop	K=10
9. Two Snaps from Level Flight	K=10
10. 180-degree Turn	K=10

GROUP III (Select 5)

1. Four-Point Roll	K=20
2. Continuously Rolling Circle with 4 rolls	K=20
3. Falling Leaf	K=20
4. Knife-Edge with half roll to Knife-Edge	K=20
5. Four-Leaf Clover	K=20
6. 8-Point Roll	K=20
7. Climbing-Diving 4-Point Roll	K=20
8. Inside Loop with Snap at Top and Bottom	K=20
9. Square Loop with half roll each leg	K=20
10. Cuban 8 with 1½ snap descending	K=20
Landing	K=5

16.2 The sequence in which the maneuvers are performed is the pilot's option; however, the maneuver sequence must be entered on the score sheet prior to handing it to the judges.

16.3. The contestant must perform a maneuver each time he passes in front of the judges except that one fly-by is allowed following takeoff.

16.4. Time limit for flight, including engine start, is 9 minutes.

16.5. The contestant may select different maneuvers and/or different sequence for subsequent flights.

16.6. A score for presentation will be awarded at the end of the flight. It shall carry a K-factor of 10.

GENERAL

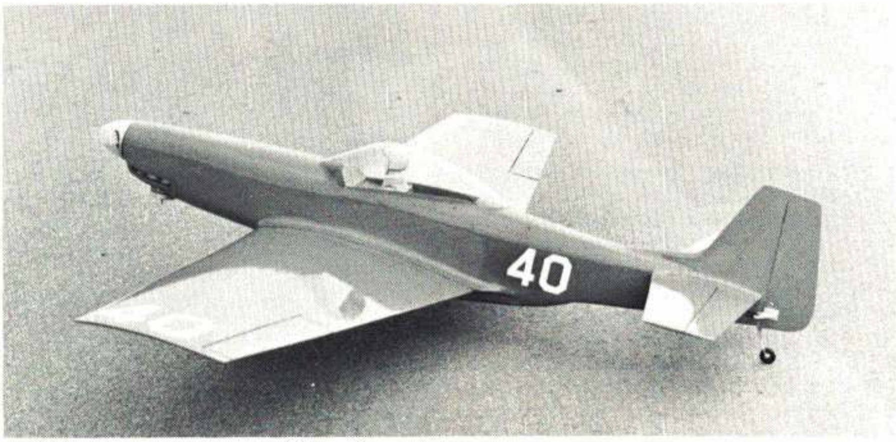
AWARD MEDALS. As a stimulus for meet organizers to schedule events for youngsters and novices without advance assurance of substantial participation, the Contest Boards acting collectively have voted for AMA to provide inexpensive medals appropriate for contest prizes in three finishes: gold, silver and bronze for 1st, 2nd and 3rd. The medals are to be sold by AMA HQ without engraving so that any not awarded can be returned (if not damaged) for credit or refund.

YOUTH PROGRAM EVENTS. The combined Contest Boards have established six supplemental events intended for competition among beginning flyers as an adjunct to the award medals described above. Four of the events are Free Flight, two are Control Line, as follows.

FF AMA Cub (or Delta Dart, AMA Racer) is an event flown either indoors or outdoors. The rules require use of the kit prop and rubber and hand winding only. It is flown for duration, with the best single flight counting.

FF Special Hand-Launched Glider is also flown either indoors or outdoors. Gliders may be either homemade or of ready-to-fly commercial manufacture, but in either case wingspan is limited to 12". Best single flight duration counts.

FF Special Rubber. This is an event for outdoor models having a wingspan not over 24" and utilizing a stock, unmodified wood or plastic propeller commercially manufactured. Free-wheeling of prop is permitted, but not folding. Duration of best single flight determines the winners.



Provisional RC Quarter Midget Pylon Racing rules have been accepted by the Contest Board. QM racer shown is a Stafford P-51 built by Ray Bingham and photographed by Roy Stephens. The picture comes from the newsletter of the Tri-Cities Aeromodelers in Tennessee.

A profile model, such as this Argander racer, may be the easiest way to get into the new CL Sport Speed event. Engines are restricted to those usually available at lower cost. Shown: Fred (pilot) and Paul Masanek.

FF Time-Target Gas. This is an outdoor event in which the winner is the flyer who obtains a flight time closest to two minutes (120 seconds). Flights over or under the target time are penalized by subtracting one point for each second over or under two minutes. Maximum engine displacement is .10 cu. in.; there is no maximum engine run time. A dethermalizer or similar device may be used to prevent loss of the model, but it cannot be used to aid in scoring; any flight in which the dethermalizer-type device actuates sooner than three minutes after release will be disqualified for scoring purposes.

CL ½A Solo Race. Any kind of Control Line model is permitted (including plastic ready-builts) which has an engine with stock, factory-equipped fuel tank and displacement not over .051 cu. in. Models must be equipped with two metal control lines of 35-ft. minimum length; minimum wire diameter of each line will be .008". One plane is flown at a time, against the clock. The entrant must fly the plane and also perform all engine starting and refueling. When the model is released, the watch is started; timing continues for 48 laps (two miles) during which time the model must land, be refueled and restarted at least once. One point will be awarded for each mile per hour of average speed for the total 48-lap period. In addition, up to 10 points will be awarded for smoothness of the initial takeoff and up to 10 points will be awarded for the smoothness of the first landing. The highest total number of points for one flight will determine the winner.

CL Sport Speed. Scoring for this event takes into account the size of the engine so that entrants may find it advantageous to use less than a maximum size engine. Only plain sleeve bearing engines may be used (no ball or roller bearings permitted). The various engine sizes allowed, plus the minimum control line wire diameters, minimum lengths and the number of timed laps for each are as follows: .000-.051 cu. in., .008 in., 35 feet, 12 laps; .052-.100 cu. in., .010 in., 52½ feet, 8 laps; .101-.249 cu. in., .012 in., 60 feet, 7 laps; .250-.360 cu. in., .015 in., 60 feet, 7 laps.

Models must take off from the ground under their own power, without outside assistance. Timing begins the instant the model is released for takeoff and continues for the number of laps indicated. Speed computation is based on a half-mile course. The winner will be the entrant with the highest single flight point score as determined by the following system: each mile per hour of average speed is considered as one point; then an adjustment is made according to the engine size by deducting one point for each hundredth of a cubic inch of diplacement (a .19-powered model which achieved an average speed of 90 mph would be awarded 90 minus 19, or 71 points).

TEAM ENTRY PILOT. If a team has more than one entry, the new rules allow different members of the team to pilot the different entries, but once a given team member has made an attempt in an event, he must make all the remaining attempts in that event. Previously a designated pilot flew all of the team's models.

PROXY FLYER AGE CLASS. The 1974-75 rules allow a proxy flyer to be of a younger age class if approved by the event director, the event director having assured himself that the younger pilot is capable of flying the airplane. Previously a younger age class pilot was not allowed under any circumstances.

PROTESTS. The new rules provide for persons "protested against" the same conditions for notification, response and appeal as is provided the accusor. Previously there were no rules concerning the person "protested against."

AMA Seeks to Halt Sale of 27 MHz Crystals for Illegal Use

In early October AMA HQ was alerted to the fact that a company was advertising crystals for sale in the 27 MHz band that are authorized by the Federal Communications Commission solely for remote control but which the company's literature states are in the "business band." Furthermore, the ad seemed to be directed to CB'ers for use in two-way communications. As a result, AMA Executive Director John Worth sent the letter which follows to the secretary of the Federal Trade Commission, Washington, D.C. When this was written, the FTC's response was unknown.

Dear Sir:

We request that action be taken to require American Electronics Corporation, 91 North McKinley St., P.O. Box 321, Greenwood, Ind. 46142 to cease and desist from false and misleading advertising.

As you will note from the enclosed flyer, American Electronics advertises and sells Citizens Radio Band crystals. The problem of lawlessness among certain Class "D" Citizens Band radio operators is well known and has, we understand, been the subject of previous correspondence some years ago between the Federal Trade Commission and the Federal Communications Commission as concerned the advertising and sales aspect of the problem.

The Citizens Band enforcement problem has particular significance to radio-controlled model aeronautics. We are attaching a copy of our recent letter to the FCC which describes the devastating effect that illegal Class "D" Citizens Band radio operators have had on radio-controlled model aircraft flying. We might add that the FCC has given us an encouraging response and plans on taking action within its purview.

The FCC does not, of course, have jurisdiction over the advertising and sale of radio equipment and thus we turn to the Federal Trade Commission and ask that it take action within its province which would help to alleviate the situation. The enclosed American Electronics flyer is false and misleading on two counts. First, it specifies that the frequencies 26.995, 27.045, 27.095, 27.145 and 27.195 MHz are "business band frequencies." This is not true. Under FCC Regulations, these frequencies are not available in the Business Radio Service. Second, under Section 95.41(c)(1) of the FCC Rules, these frequencies are reserved exclusively to Class "C" operators for "control of remote objects. . .by radio" i.e. radio control of model aircraft (as well as other types of models) and may not be used for the type of two-way communications usually indulged in by Class "D" Citizens Band operators.

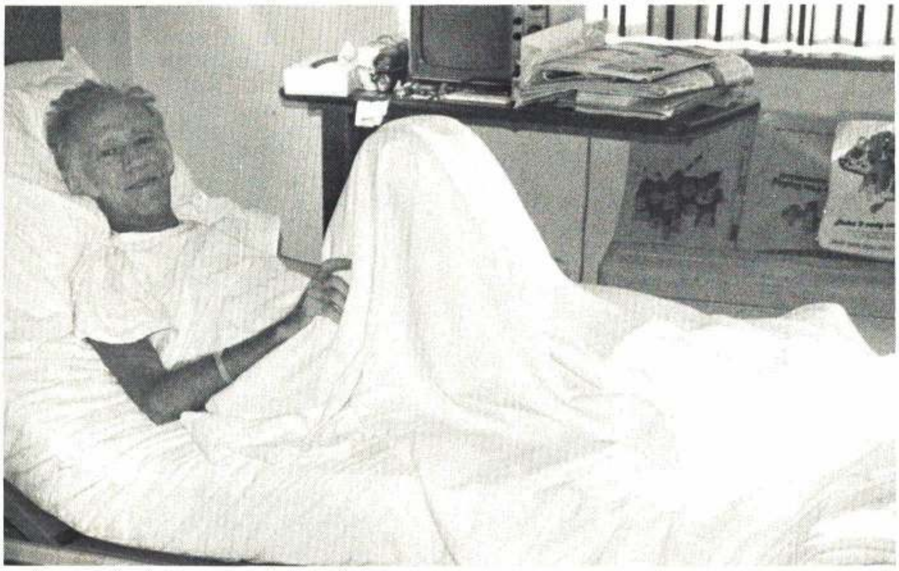
We request, therefore, that American Electronics be directed to rectify its advertising to make clear that crystals for these frequencies should be purchased only by persons proposing to use them for radio control of remote objects; that use of these frequencies for other purposes is unlawful and may subject such users to criminal penalties as well as to civil liability if their unlawful use causes radio-controlled model aircraft to go out of control and crash or damage the person or property of other people.

We would appreciate prompt action in this matter since, of course, unrestricted sale of this equipment under these conditions will exacerbate a problem which is already of large proportions.

This Is The Last Issue For 1973 Members

Only those who renewed membership by December 15 can be assured of receiving continuing issues of the publication–either the full Aircraft Modeler Magazine or the "AMA News" reprints, depending upon the option desired. AMA members for 1973 who didn't pay 1974 dues by this date likely will miss the March magazine or reprint. It's simply the mechanics involved; the March issue is mailed in January, but it's in December when copies have to be ordered and the mailing tapes have to be prepared.

Similarly, for subsequent issues, it's necessary to get membership processing initiated as soon as possible–it's too costly and complicated to do anything else. If you haven't signed up yet for 1974 AMA membership, do it now in order to avoid losing any more service–if your dues payment is received by January 15, you will receive the April magazine or reprint, both of which are mailed in February.



This is where AMA President John Clemens spent many weeks following two rounds of major surgery. But there's a silver lining to most every adversity. Clemen's confinement to bed provided much opportunity to think about (and make notes concerning) ways and means of implementing the idea for AMA to obtain its own permanent Nats site and museum. When this was written in mid-November, Clemens was at home for additional recuperation.

NEWS bits

'74 Nats Site

No decision as yet, but several locations are in the running. One that seemed especially promising when this was written was a former U.S. Air Force Base at Lake Charles, La., now under city control. Lake Charles is about 200 miles west of New Orleans and halfway between that city and Houston, Tex. Chanute Air Force Base in southern Illinois still is a possibility, although some major problems would be involved because the Air Force has indicated it probably would not be able to do more than simply let us use the property. Also being looked into are a former Air Force Base in Oxnard, Calif. (near Los Angeles), Wright-Patterson AFB at Dayton, Ohio (home of the Air Force Museum), and an offer from Amarillo, Tex. Other possibilities are Newton, Kans. (home of the Bede lightplanes) and Lakehurst Naval Air Station in New Jersey (which also has been offered for the Scale and Indoor World Championships).

In strong contention earlier as a possible '74 National Contest site was the Ontario Motor Speedway near Los Angeles; however, costs connected with use of the facility have tempered the earlier enthusiasm. Oshkosh probably will not be the Nats site in 1974; preliminary explorations indicate that some of the major difficulties encountered in 1973 are unlikely to be improved upon.

Gals and Guys with both CL and RC planes turned out for the K.I. Sawyer AFB demonstration at Gwinn, Mich., last September. All were members of the UP Model Aeronautics Assn.

'74 World Champs in U.S.?

It's a possibility which should be resolved by the time this issue reaches newsstands. AMA earlier had made a tentative offer to be host for the Scale (Control Line and Radio Control) World Championships in 1974 and also possibly the Indoor World Championships. For a time it looked as if obtaining a proper site (both facilities and location with respect to a European arrival point) would be a stumbling block, but recently Lakehurst Naval Air Station in New Jersey has been offered–which would work out well for both Scale and Indoor.

AMA's Executive Council was considering whether to proceed with a firm offer to be WC host in 1974; assuming a favorable recommendation by the council, the offer would then be considered by the Federation Aeronautique Internationale (FAI) Committee for International Aero Modeling (CIAM) which was to meet in Paris at the end of November.

Early planning revolved around a likely WC date in early July, and a charter flight for European contestants and supporters arranged in England.

Check Servo Return

Lee Webster (AMA 168) learned the hard way that he should check whether controls return to neutral during the pre-flight engine run-up, and not just whether the controls move. Had he done this, the crash of his Fokker Triplane most likely would not have occurred. This information came from a report by Webster (who is also AMA Dist. V Scale Contest Board member) which appeared in Air Foiler, newsletter of the AMA chartered Coffee Airfoilers MAC of Tullahoma, Tenn.

What might have been diagnosed as radio, servo or structural failure–or interference–was finally determined to be a binding of the aileron torque tube assembly in the wing. But there was no reason to suspect this up until the time of the ill-fated flight because frequent checks had never indicated any binding, and the plane had flown perfectly two days before. (Fortunately damage to the Fokker was not too severe, and months ago it probably was repaired and flying again.)

According to Webster, the root of his problem was use of wooden dowels running in plywood bearings to transmit torque to the aileron linkages. This was coupled with leaving the plane locked in the trunk of his car for a few hours in the hot sun, a slight trunk seal leak, and a heavy downpour the day before–these factors teamed together to produce a wood-swelling steam which made the torque tube assembly bind.

The resulting two-pronged advice is to not use a wooden bearing and shaft assembly, and to check how well the controls return to neutral, not just to see if the surfaces move.

Dist. IV AMA Team

A program initiated by AMA District IV Vice-President John Spalding has resulted in the addition of AMA representatives from chartered clubs to the AMA team which already included, in addition to VP Spalding, associate vice-presidents, Contest Board members and contest coordinators.

The club AMA representative plan is intended to further improve communications within the district and also as a means for the VP to obtain feedback on issues which he, as a member of AMA's board of directors known as the Executive Council, will have a hand in resolving. Hopefully the club AMA reps will maintain a constant stream of dialogue between both themselves and VP Spalding.

Any District IV chartered club which has not yet selected an AMA representative, and wishes to do so, should notify John Spalding, 5803 Ellerbie St., Lanham, Md. 20801.

Airplane and Books

. . .were go-togethers when members of the AMA chartered Fingercrackers Club of Eau Gallie, Fla., displayed their models at the city public library recently. Each plane was accompanied by a trophy it had won, and the display also included the club's AMA charter certificate, printed programs from contests run by the club, a variety of model airplane magazines, and snapshots of club members with their planes. This is another good means of getting modeling before the public.

New AMA Book

Have you ever wanted to have before you hundreds of plans of kits available from hobby shops or by mail order? You know, the kind of thing to let you know what a kit is like without incurring the wrath of your local dealer as you open up kit after kit. If you answered yes, you'll want to obtain the Kit Plan Book, compiled by AMA Technical Director Frank Ehling, and produced by AMA HQ. Price: $2.50. Order from AMA Supply & Service, 806 Fifteenth St., N.W., Washington, D.C. 20005.

The Book is a big 9" x 12", 136 pages, chock-full of reduced size plans from airplane kits of Ace R/C, Andrews Aircraft Model Co., Carl Goldberg Models, Chuck Gill Models, Competition Models, Jetco Models, Junior Aero Space Co., Midwest Products, Mini-Flite Co., Nelson Model Products, Sig Mfg. Co., Sterling Models, Top Flite Models and World Engines. All types of models are included: RC, CL, Scale, FF–Sport and competition designs in each category. Imagine sitting in your workshop and poring over more than 200 plans–helps you decide what you want before plunking down your dollars.

Win Your Wings

The AMA chartered Lexington (Ky.) Model Airplane Club has an interesting incentive program. Members who successfully put in a solo flight (takeoff, flight and landing) with a CL, FF or RC model, are presented with a free set of AMA wings. Presentations, with appropriate hoop-de-doo, are made during regular club meetings. The club also maintains CL trainer planes, and instructors, for teaching young and/or new club members to fly. Jointly, these ideas should stimulate activity among the newcomers.

Send Pictures

Readers tell us that they enjoy seeing what other AMA members are doing and flying through the pictures printed in the AMA News section. It's a service we enjoy providing, but it is dependent upon photo submissions by the readers.

Won't you help? All types of photos are needed: RC, CL, FF, Indoor, Scale, action, posed, construction, gimmicks, etc. All types of prints are acceptable, black-and-white or color–including the instant development type. On the back of each print write the name of the photographer, the names of the persons and models shown, and a brief description of each model's features. No payment possible for photos used, but photographers will be credited. Send pictures to Publications Director, AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005.

Model flying in front of the nation's Capitol took place when the Aero Club of Washington, a chapter of the National Aeronautic Association, sponsored a big Delta Dart contest for D.C. area youngsters in cooperation with the AMA and the National Air Space Museum. Construction between CL flyer Les King and the Capitol is for the museum's new home. Area clubs not only provided demonstrations of more sophisticated models, but they also helped instruct youngsters how to build the Delta Darts and time the competition flights.

Jack Smith of Lufthansa German Airlines, left, one of the sponsors of Aero-Crafts '74, poses for publicity shot with Robert Nobel, curator of the Philadelphia Civic Center Museum (host of the event which is open for viewing from March 23 to April 18), and Paul Heintz, aviation writer, official of the Franklin Institute and member of the jury panel for Aero-Crafts. There's still time for AMA members to enter—up until January 31. Models do not need to have flown. For entry forms, write to Aero-Crafts '74, The Museum of the Philadelphia Civic Center, 34th and Civic Center Blvd., Philadelphia, Pa. 19104.

CL Stunt and RC Pattern Special Interest Groups Formed

Add PAMPA and NSRCA to your list of modeling acronyms. The initials stand for the CL Precision Aerobatics Model Pilots Association and the National Society of Radio Controlled Aerobatics, two groups recently formed to promote the interests of modelers who enjoy these activities. Both grew out of informal meetings which took place during the 1973 National Contest.

PAMPA dues are $5 per year, including a monthly newsletter. For membership, send a $5 check or money order payable to PAMPA to Wynn Paul, 1640 Maywick Dr., Lexington, Ky. 40504. In addition to your name and full address, also indicate your AMA number, home telephone number, occupation and date of birth.

NSRCA dues are $4. Send to Rhett A. Miller, 3039 Lakeshore Dr., Tallahassee, Fla. 32303. Provide your full name and address, and also your AMA number.

Witt Re-elected Secretary-Treasurer

In the balloting for election of AMA officers to serve the 1974-75 term, concluded on November 15, the tightest race was for the office of secretary-treasurer between incumbent Earl Witt of Chambersburg, Pa., and John Patton, former AMA President of Frederick, Md. Witt garnered 2,414 votes to Patton's 2,290. There were six miscellaneous write-in votes for others.

District Vice-President Results

I: Incumbent Cliff Piper, who was unopposed on the ballot, was re-elected with 372 votes. Write-in candidate Al Novotnik received 51 votes, and there were five write-ins for others.

III: Incumbent Ron Morgan received 430 votes to remain in office. James Slater received 358.

V: Jim McNeill, unopposed, received 438 votes. There were two write-ins for others.

VII: Jack Josaitis, the incumbent, remains in office after having received 321 votes to Charles Spencer's 155.

IX: Unopposed incumbent Stan Chilton received 191 votes to be re-elected.

XI: Homer Smith won over Dick Carson with 146 votes to 96.

The election just concluded was for the offices of national secretary-treasurer and vice-president of the odd-numbered AMA districts. The next election, in late 1974, will involve the presidency and VP's of the even-numbered districts.

Hobby Dealers–Clubs–Leaders: need AMA application blanks? For a free supply write to AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005. Specify how many are wanted.

Insurance Problems

The November issue of RC Modeler Magazine included a letter on the editorial page complaining about poor service in connection with an AMA insurance claim. An accompanying comment noted that only one side of the story had been heard. Unfortunately, by publishing only one side and making no attempt to get the other side from AMA, the result made the AMA insurance program look bad. Worse yet, this meant that there would be a two month or more time lag before the rest of the story could be told. Nevertheless, AMA responded immediately, on October 1, and sent a letter to RCM with essentially the same information as that which follows:

The most important point about the letter to RCM is that the insurance company DID pay–$1600. Aside from all else that fact should be kept in mind.

The accident happened on May 13. AMA received the accident report from the Contest Director on May 31, more than two weeks later. Settlement was made on August 13, within 90 days after the report of the accident. But the key point is that the settlement was made within a few days of notification to HQ that a problem existed. HQ was able to help, even though deep in the middle of the 1973 Nats which had many other problems, and despite the fact that it is rare for liability claims involving extensive injury to be settled quickly, as compared with property damage claims which are obvious concerning the dollar value to be compensated. Injuries often have after effects and continuing expenses.

John Kiker, member of the Manned Spacecraft Center RC Club (Houston, Texas) called recently to praise HQ action in this insurance claim involving a fellow club member. He said he was also writing to RCM to help tell 'the other side' and correct the bad impression given of AMA insurance. John noted two key points: that the insurance did pay off (in the amount of one thousand six hundred dollars) and that having the AMA HQ staff to intervene with the home office when a local representative goofed was a very reassuring factor. In other words, AMA does not simply contract for insurance services and shrink from further responsibility–on the contrary AMA HQ personnel take a personal interest in each claim and step in when necessary to protect members' interests.

The basic problem in this case was apparently a claims adjuster who didn't know his business. Once AMA got the home office into the case the problem got settled. Unfortunately, there are good and bad people in all companies, so this kind of problem can happen with any company.

In the past ten years of AMA insurance coverage there have been four different companies involved. Each one had the same problems with local claims people making the company look good or bad, depending upon the circumstances. No company has a monopoly on good people–our experience proves that. So the problem exists. But it can be overcome, when necessary, by help from HQ. When HQ got the word that there was a problem, it had been developing and festering for weeks. If AMA HQ had known earlier much of the aggravation could have been avoided.

Another problem in this case was that the AMA member whose model caused the injury did not do his part. In any accident the insured should make the report to the insurance company. With liability insurance the insured is the one who is liable to be sued, so it is the coverage on him which comes into play to help the victim. The AMA member who got hurt was not the insured in this case. He was the victim. Without the cooperation of the insured he was in a compromised position. Had the victim not been an AMA member, the situation might have been even worse. But because he was an AMA member we were able to get the insurance company to take action without help from the other AMA member whose insurance was involved.

Not only did the AMA member who got hurt (by an RC Pylon model) get compensated, the other AMA member–WHO DID NOT HAVE ANY OTHER INSURANCE–was protected against suit. So the AMA coverage did what it was supposed to, despite some delay and confusion. That should be reassuring to anyone who worries about being protected.

Liability insurance is a very complicated subject with many extremely difficult legal questions involved. It needs to be realized that this is not accident insurance. Accident insurance protects the victim rather than the one causing the accident. As a result, because that kind of protection is more direct it costs much more –Blue Cross and Blue Shield coverage, for example.

A single accident can wipe out any profit to the insurance company. Luckily, in two deaths due to model airplane accidents in the past ten years, AMA insurance was not involved. This good fortune has helped build a record which now may withstand such a disaster–over 30 years of premiums exceeding claims. Without such a favorable record any new insurance venture may find it very difficult to survive major claims.

James Artz

Profile of a Life Member

by Jim McNeill

To James Artz, a busy aircraft industrial engineer with Rockwell International, airplanes are more than a hobby–they are a way of life. Starting young, Jim at age five was building model planes with his older brothers, Hank and Bill. By the time Jim was 10, the three had fastened a Brown Junior onto an original Free Flight and were urging it to fly. Subsequently they advanced to Comet Clippers, Zippers, Playboys, Korda rubber jobs and Valkyries. Together and individually the brothers built numerous models, running the gauntlet of those then available. An amiable person, Jim became president of two different model clubs before he was 21.

Choosing a career in aviation, Jim went after the real airplanes with the same zeal he had for the miniature ones. He started at the bottom, as mechanic, welder, machinist, assistant crew chief, flight engineer, foreman, senior flight test engineer, spacecraft lead engineer (during which time he helped set up the White Sands Testing Grounds), and finally achieved his current status of industrial engineer. In this position he is responsible for the initial test facilities for the B-1 aircraft at Edwards Air Force Base in California, and is the liason between the base engineers, the Army Corps of Engineers, and the contractor.

He also designs the layouts for new hangar arrangements, supervises their construction, and fabricates support items for testing.

His early training in hand and mind coordination has served Jim well, enabling him to solve innumerable perflexing problems. He is credited with the invention and development of an automatic sewing bobbin, a jet engine pilot burner nozzle, a dual pressure reducing regulator and an "aileron induced" wash-out effect mechanism.

At home Jim is finishing a high performance full size sailplane with which to challenge the 46,267 ft. altitude record, has built and flown a biplane and helped with three Formula I racers. He holds pilot's licenses for single, multi, and glider. Jim even has a Radio Control model plane under construction. Jim and his wife Eloise have two sons, James Jr. and Richard, and live in Quartz Hills, California.

Why did Jim Artz become an AMA Life member?–In a spirit of gratitude. Here's what he says about modeling: "My interest in model making has had a direct influence on my job placement and advancement over the years, due to skills developed through the hobby. AMA deserves a lot of credit for keeping this interest glowing. My donation is a repayment, in an extrmely small way, for what I feel the AMA has done for me and others."

We welcome this distinguished engineer, AMA L12, to our small AMA Life member group.

From the Pages of History

"Model airplanes are not to be considered as childish toys."

By Lt. H.W. Alden

While it is generally agreed that model airplane building and flying offer an excellent medium for aeronautical instruction in the elementary and high schools, it should be realized at the outset that there is a distinct limit to which this medium may be used for the basic purpose.

Many of the fundamental principles of flight are demonstrable by means of models, but the model offers principally a study in slow speed aeronautics, whereas the trend in full sized craft is to ultra high speed.

It is only too well known by the experienced model enthusiast that a plane may be scaled down to model size, but the flight characteristics or flying effect cannot be accurately scaled down. This necessitates constructing models that do not strongly resemble large craft in appearance if good model performance is desired. Propellers, tail surfaces and wing locations must be distorted radically to insure reasonably good flights.

The recent successful advent of the small gasoline motor has done considerable to overcome this, however, and models of approximately six pounds weight and eight foot wingspan are being flown with 1/5th horsepower engines at speeds around fifteen to twenty miles per hour. Obviously these craft are unsafe in the care of very young owners.

Still, the model airplane does give the most practical means for stimulating classroom and playground interest in elementary aviation. Since the teaching of the science of flight does require some concrete method of demonstration and a means whereby the young student may engage in active participation in actually doing, the model is strongly recommended as the most suitable instrument for this purpose.

For those who are in manual training classes, the detailed non-flying scale model offers a wonderfully complete range for the use of hands and tools as well as patience. The choice of materials is almost unlimited, and the finished model reflects to a marked degree the skill of the builder. The very best models of this sort have required as much as 3,000 hours work, but this amount of work or detail could scarcely be recommended for the manual training class.

Many of those who have once been started in model building and flying find it so intriguing that they voluntarily continued along

Part of a group of about 30 FF Gas models entered in a 1937 contest at Decatur, Ill.

advanced lines. There are many active builders and flyers of airplane models who are well advanced in age. This is especially true in England where the members of the Society of Model Aeronautical Engineers are mostly adults. In the United States the most successful builders and flyers range from thirteen years to forty years of age.

In order to hold sustained interest among the advanced model flyers, several of them are generally found in every community banded into an active club. Such clubs give an exceptional opportunity to well qualified leaders in schools to carry on a useful and instructive work. The club idea does not seem to work out very well, except among the most enthusiastic. Those who are not actively interested do not attend meetings regularly and soon drop out entirely. It should be unnecessary to point out that the success of such clubs depends for the most part on leadership—whether it is sympathetic, intelligent, active, enthusiastic, etc.

The interest in model flying is fairly dependent on contests. Otherwise, there is not available a means for comparing and demonstrating the builders' respective ability. These contests should be held quite frequently, certainly as often as once a month. Intercity and interclub meets are desirable.

Model airplane contests deserve the most careful and dignified attention to their management and conduct. It is mighty important to a young builder that his model be given all the consideration that his painstaking work calls for in his mind. A great deal of heart and soul, effort and general ability, have gone into the construction of contest models.

The National Aeronautic Association, through its Contest Committee, undertakes to give official recognition to record performances. A comprehensive set of rules, definitions, and contest procedure has been formulated to standardize model airplane contests throughout the country and make record flights comparable no matter where they are made. At present the association lists forty-eight official model aircraft records.

Model airplanes are not to be considered as childish toys. They are distinctly scientific mechanisms and should occupy a respected place in the educational program of any country. However, they are one of those things which cannot be persuaded upon the unwilling youngster. Their greatest usefulness would appear to be as a stepping stone to the general subject of aeronautics and as a worthwhile scientific hobby.

BACKGROUND. The author, Lt. H.W. "John" Alden, was one of the prime people in the creation of the AMA, known in its early days as the American Academy of Model Aeronautics (AAMA). Previous to the organizing of AAMA, U.S. modeling activity was governed and promoted by the National Aeronautic Association's Model Airplane Committee for which Alden was chairman. During this period (probably in 1934) Alden wrote the preceding article—which comes remarkably close to today's world despite the passage of almost 40 years.

When the AAMA became an entity in 1936, Lt. Alden was elected to the post of secretary-treasurer, maintaining the headquarters operation and being primarily responsible for producing the first few issues of the organization's magazine, Model Aviation. Illness forced his retirement later in 1936 from what was mostly a volunteer operation, even to paying postage expenses and the like. He did not get back into modeling, and in 1951 he was killed in the Phillippines while he was a civilian working for a contractor.

CL Speed modeling looked like this when in its infancy. Probable photo date is early 40's.

CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

Note: For quick response and as a favor to those staging, administering and directing the contest, be certain to send a stamped, self-addressed, envelope along with your request to the listed Contest Director (CD) for additional information.

JAN. 12-13—EL PASO, TEX. (AA) El Paso Radio Controllers Annual RC Fun Fly. Site: El Paso. R. Brown CD, 9624 Albacore Ln., El Paso, Tex. 79924. Sponsor: El Paso Radio Controllers.

JAN. 19-20—BUCKEYE, ARIZ. (AAA) 24th Southwestern FF (Cat. I), CL & RC Regionals. Site: Buckeye Airport. R. Gudahl CD, 615 E. Winter Dr., Phoenix, Ariz. 85020.

JAN. 26-27—PHOENIX, ARIZ. (AA) 3rd Annual Southwestern RC Championships. Site: Au[illegible] K. Peterson CD, 4202 W. State Ave., Phoenix, Ariz. 85021.

CANCELLED

JAN. 27—AURORA, COLO. (A) MMM Indoor (Cat. I) Meet. Site: Gateway High. H. Blubaugh CD, 555 Moline, Aurora, Colo. 80010.

FEB. 3—GREEN BAY, WISC. (A) Annual Polar Bear FF (Cat. I) Meet. Site: Frozen Green Bay. R. Cowles, Jr. CD, 2424 Ducharme Ln., Green Bay, Wisc. 54301.

MARCH 23-24—SAN ANTONIO, TEX. (AA) A.R.C.S. Spring RC Contest. Site: San Antonio. D. Bottoms CD, 3329 Fredericksburg Rd., San Antonio, Tex. 78201.

APRIL 27-28—MESQUITE, TEX. (AA) Dallas RC Club 10th Annual RC Pattern Meet. Site: Samuels Park East. D. Brown CD, 930 Vinecrest Ln., Richardson, Tex. 75080.

APRIL 28—CINCINNATI, OHIO (A) 3rd Annual CL Combat Bash. Site: Lunken Airfield. W. Messerly CD, 1122 Eight Mile Rd., Cincinnati, Ohio 45230.

MAY 1—ROCKFORD, ILL. Rock Valley RC Flyers 2nd Annual Static Display. Site: Rockford. F. Vidmar CD, 4705 Highcrest Rd., Rockford, Ill. 61107.

MAY 25-26—CLOVIS, N.M. (AA) MADS Annual RC Contest. Site: MADS Field. E. Harvey CD, Star Route, Box 48, Clovis, N.M. 88101.

MAY 25-26—COUNCIL BLUFFS, IA. 2nd Annual National Falcon Tournament. Site: Council Bluffs. M. Wilken CD, 136 Zenith Dr., Council Bluffs, Ia. 51501.

JUNE 15-16—FT. WORTH, TEX. (AA) 4th Annual "Lone Star RC Aerobatic Convention". Site: Ft. Worth. L. Stanfield CD, 1617 Lagoona Ln., Ft. Worth, Tex. 76134.

JUNE 29-30—LIMA, OHIO (AA) LARKS 1st Annual RC Pattern & Standoff Scale Meet. Site: Bath Twp. House, Rt. 81. G. Lucke CD, 970 Brice Ave., Lima, Ohio 45805.

JULY 6—DAYTON, OHIO (A) 1st Annual DARTS RC Soaring Competition No. 1. Site: Municipal Field. L. Gleason CD, 108 Cushing Ave., Kettering, Ohio 45429.

JULY 7—DAYTON, OHIO (A) 1st Annual DARTS RC Soaring Competition No. 2. Site: Municipal Field. W. Pinnell CD, 2474 Bangon Dr., Dayton, Ohio 45431.

AUG. 25—W. SUFFIELD, CONN. (A) Nor-East RC Air Races '74. Site: NCRCC Field. B. Williams CD, 347 Southwick Rd., Westfield, Mass. 01085.

SEPT. 14-15—W. SUFFIELD, CONN. (A) Nor-East RC Air Races '74. Site: NCRCC Field. B. Williams CD, 347 Southwick Rd., Westfield, Mass. 01085.

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AAM COMMANDER

(Continued from page 101)

The only trick was to get the transmitter board mounted. Ed solved this nicely by using threaded brass rod to make standoffs. Each standoff must be bent slightly to align with the holes in the p.c. board. The board is secured by a 4-40 nut above and below the board on each standoff. A fiber insulation washer should be used under each nut on the printed circuit side of the board.

The second approach permits one to retain use of the original Rand stick assembly. Purchase the rudder control shaft assembly only for one of the above mentioned three axis sticks and modify the Rand stick housing and the rudder control stick to work together. The accompanying photos show how this was done using an Orbit assembly.

The following steps were necessary for the Orbit stick.

(1) Disassemble the rudder control assembly so that the ball and shaft are completely free.

(2) Place the upper (long) end of the shaft in a vise with the ball resting on the vise.

(3) Place a block of wood on the lower (slotted) end of the shaft and tap gently to press the ball down the shaft until it reaches the edge of the hole where the rudder pot wires exit the shaft.

(4) Disassemble the Rand stick and file the socket cap, in which the ball will sit, until a smooth, slop-free fit is obtained between the ball and socket. The ball on the Orbit stick is smaller than in the Rand.

(5) The nylon "tee" fitting that goes on the lower end of the shaft prevents the shaft from rotating when the rudder control is rotated. The slots in the Orbit bails are smaller than the Rand, so the tee fitting must be shimmed for a precise fit. We did this by cutting a 1/4 length from the old Rand stick to fit on the rounded part of the tee fitting. Then the rectangular fitting was filed flat on one side, the ends of the rectangular piece were cut off 3/32 (to permit full throw in each direction) and a thin flat shim of nylon was attached to the filed side (using silicone rubber) to mate exactly with the stick bail.

(6) The entire stick is assembled and checked for smooth fit and free operation. If not, work at it until it operates smoothly. The process is tedious, but results in a three axis stick that is smoother and tighter than any commercially available if properly done.

Finally, wire up the stick to the p.c. board as shown in Fig. 5. The 2K resistor is needed for the rudder control pulse to be 1.5 ms long because the Orbit stick uses a 5K instead of a 6K pot used on the other channels. Don't clip the unused lead (white) from the Orbit stick too far back because you might wish to have rudder throw reversed sometime and access to that lead makes it simple.

Using Two Rand Sticks—The work of mechanical conversion is considerably simplified if a second Rand stick and a new case with antenna fitting is purchased from ACE RC. One need only (1) assemble the second stick in accordance with the instructions that come with it; (2) mount both sticks, the antenna fitting with lug, and the power switch to the case; and (3) wire the p.c. board to the controls as shown in Fig. 6. All wiring must be neatly cabled and should be tied with lacing cord at intervals. Use heat-shrink tubing to sleeve at each control pot lug. Remember that control throw can be reversed by switching the wire on the pot end terminal to the opposite end terminal and readjusting for 1.5 ms neutral. (See July 1972 **AAM** for instructions for timing adjustments.)

Using Two D&R Open Gimbal Sticks—Obtain a set of open gimbal sticks from D&R to put in the transmitter case of your choice or order a set of the D&R sticks and a pre-punched case from ACE RC. Excellent performance will be the result. (1) Mount the sticks and the antenna fitting with lug to the case. (2) Wire up the transmitter p.c. board to the sticks as shown in Fig. 7. In this instance, we have shown a continuous +3.6 volt "buss" wire (white) that goes to each of the primary and trim controls. The trim pots are 1000 ohms; the primary control pots are 5K ohms. (3) All channels are adjusted to 1.5 ms at neutral by rotating the small tabs on the fitting that grips the pot element for each primary control. Remember to retighten the pot mount screws after such adjustments.

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We definitely prefer either of the two latter arrangements to conversion of a single stick for the following reasons: (1) The cost will be almost the same for a new case and either the Rand or D&R sticks as it will for the single stick rudder assembly plus the slider pot and other items; (2) it is much easier; (3) the final result is more professional and easier to handle; and (4) no manufacturer will be particularly happy if you order some special item like a rudder control assembly from him. We know because we asked!

We also recognize the creativity of our readers who will find many other ways of coming up with the mechanical arrangement. We appreciate this and hope that you will send us descriptions of your approach so that they can be passed on to other readers.

We have constructed and operated a number of these conversions and find them to give the same trouble-free operation as the two-channel since basic operation is not affected. Incidentally, the arrangement shown on the transmitter face for charging is one of the handiest things we've stumbled across. Since we use the ACE dual charger as an external charger for the transmitter and receiver, we needed a neat connector that didn't force us to cut another square hole. A D&R airborne charging connector is perfect because it is round and already has mounting lugs on it. Purchase the connector and charging cord and you are in business.

Operation of the transmitter has been good on both 27 and 50 MHz. However, we haven't shown any conversion to 72 MHz because it requires FCC type certification. Although not legal for operation without certification, we did make one experimental conversion using a Heathkit dual-frequency 72 MHz RF board. This just required connecting the +9V, ground, and modulation output from the three RF chokes on the encoder board to the appropriate input points on the Heathkit board. Operation was quite satisfactory. However, the reader is reminded that he is not permitted to operate that way without FCC type certification.

ON THE SCENE

(Continued from page 14)

The FAI/Formula II event was viewed with interest by many. Our area is probably the last stronghold for Formula II. Bill Zaunter was in attendance with his fast tuned pipe FAI ship, and a lot of the dyed-in-the-wool Formula II fliers were interested to see Bill in action against some of the circuit's better fliers. Due to the weather and crashes this did not happen. However, Zaunter served notice that an FAI ship could fly competitively against a Formula II by turning a 1:39 in a 35 mph crosswind. Because of the rain on Sunday, he left before the event was completed and ended up fourth.

Ernie Nikodem, of Buffalo, New York, flying a Mustang powered by a 73 K&B Schnuerle with an Orbit radio, finished first. Time, 1:53. Hal deBolt, also

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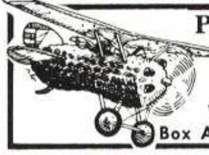

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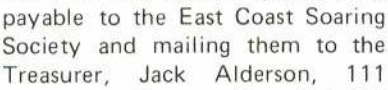

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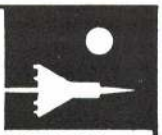
ADVERTISER'S INDEX

A & L Distributors 82, 91
Academy Products Ltd. 83
Ace Radio Control, Inc. 34, 35
Aerotec Model Engineering Co., Inc. . .111
A-Justo-Jig .111
Astro Flight, Inc. 93
Better Built Airplane Prod. 99
Boyd Models 110
Bridi Hobby Enterprises 85
Cannon Electronics 94
Cleveland Model Supply 111
Coverite 98
DA Enterprises 85
The Diane Publishing Co. 96
Dremel Manufacturing Co. 5
Du-Bro Products, Inc. 49
Experimental Aircraft Assn. 97
F.A.I. Model Supply 111
Flyline Models 83
Fox Manufacturing Co. 98
Futaba Industries, U.S.A. 67
Goldberg Models, Inc., Carl 9, 65
Graupner, Johannes 27
Grish Brothers 91
W.C. Hannan, Graphics 111
John Hathaway 110
Heath Co. 15
Hobby Helpers 111
Hobby Hideaway 91
Hobby Lobby 10, 11
Hobby Shack 40, 41
Indy RC Sales 86
In-Flyte Products 99
JoMac Products. 87
K&B Manufacturing 95
Karl's 71
K&S Engineering 39
Kayeff, Inc. .75
Kraft Great Lakes 92
Kraft Systems, Inc. . . . . *Inside back cover*
Larry's Hobby Supply 101
MTF Enterprises 33
Major Electronics 98
Midwest Model Supply Co. 100
Midwest Products Co. 13
Miniature Aircraft 83
Model Materials Co. 76
Model Rectifier Corp. . *Outside back cover*
Morgan, Sid 113
National Air & Space Museum 87
Nosen, Bud. .85
Octura Models 101
Orbit Electronics 75
Peak Hobbies, Inc. 76
Peck-Polymers 113
Platt Models, Inc., Dave 92
Prather Products 77
Randolph Hobby Distributors 74
Randy's Corner 77
Rocket City Specialties 93
Scientific Models, Inc. *Inside front cover*, 3
SEE TEMP .111
Semco Model 82
Shamrock Competition Imports 110
Sig Manufacturing Co. 58, 59
Sterling Models, Inc. 79, 80, 81
Squadron Kites 101
Su-Pr-Line Products 86
T&L Glassflite Wings 93
Tatone Products 74
Terry Plane .78
The Testor Corp. 90
Top Flite Models, Inc. 7
Tower Hobbies 22, 23
Universal Systems 97
Westcoast RC Products 92
Windspiel Models 78
World Engines 88, 89



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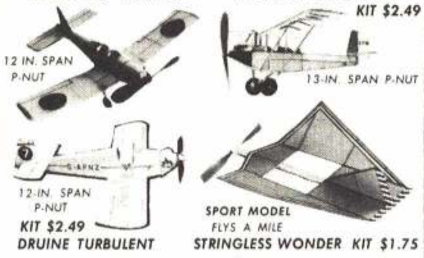

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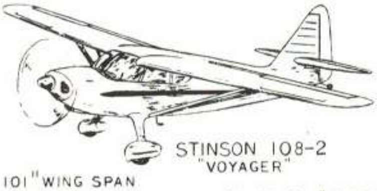
of Buffalo, was second with his Caudron. HP 40 for power and an Orbit for guidance. Best time, 1:55. Canadian Steve Nagy, flying a P-51, 73 K&B Schnuerle with Orbit radio, was third. Best time, 1:51.

The Formula I event was abbreviated due to the time lost earlier in the day because of rain. Also, many entrants felt the event would not be flown because of the heavy rain between 11 AM and 2 PM, and left early. However, the event was indeed flown. Ernie Nikodem, flying a Minnow with a 73 Lee K&B Schnuerle and Orbit gear, again emerged victorious. Best time, 1:42. Hal deBolt's Midget Mustang, 73 K&B Schnuerle guided by an Orbit, placed second with a best time of 1:47. Dick Smith of Rochester, New York, was third with his yellow Minnow. Another 73 K&B Schnuerle turned the prop and a Pro-Line Radio relayed his commands.

The most spectacular happening in Formula I was Hal deBolt's spot landing on top of Kent Landefeld's Wagner Cosmic Wind. If he had been trying, he would have missed by a mile.

Ernie Nikodem, by scoring a double win in the Formula events, garnered sufficient points to tie Kent Landefeld for the season championship. Normally this would have resulted in a flyoff, but due to the spot landing accident and equipment failure which wiped out his Formula II, he had nothing available with which to compete. Someone suggested a foot race. Landefeld promptly sprained his ankle.

In closing, we want to thank the fellows who did all the work in less than desirable weather for two days.



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OFF THE SCENE

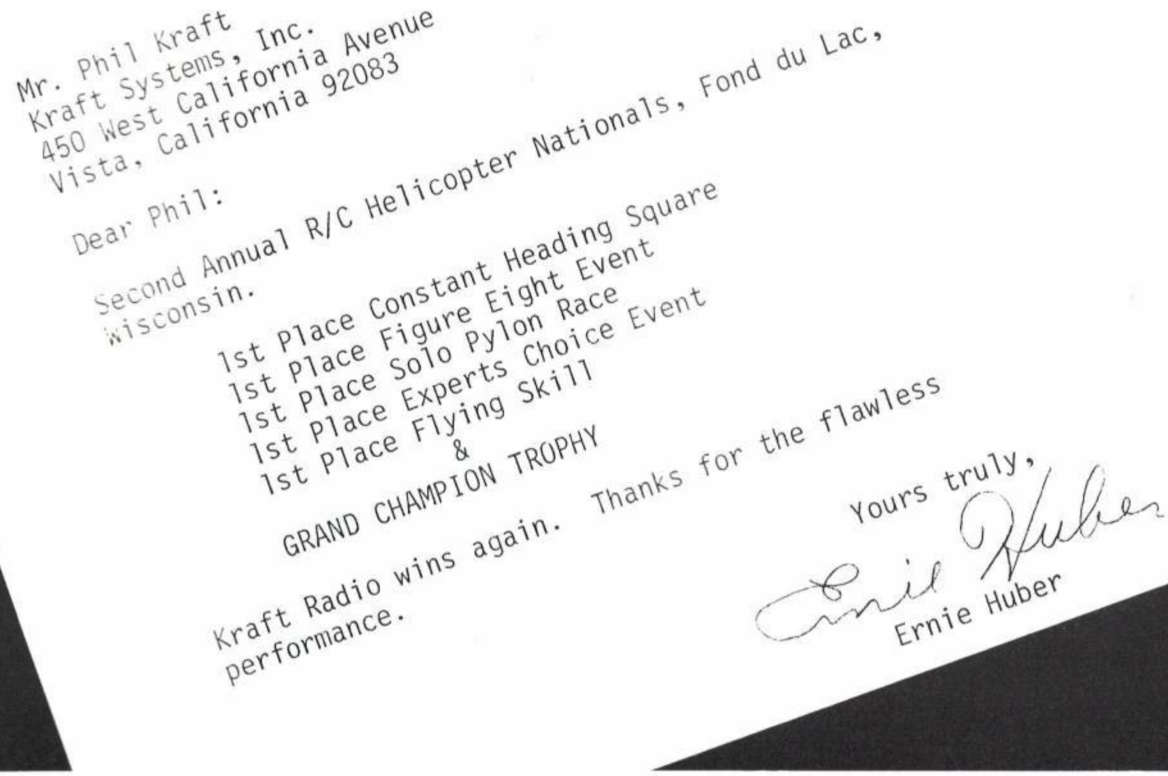
"Harold! . . . aren't you carrying this model airplane thing a bit too far?"

"You and those airplanes. . . somehow I knew this would happen!"

"Let go, Shirley, let go!"

". . . and that is what the owner's manual refers to as a rough or unusually hard landing!"

"I told you I was no Howie Keefe!"



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